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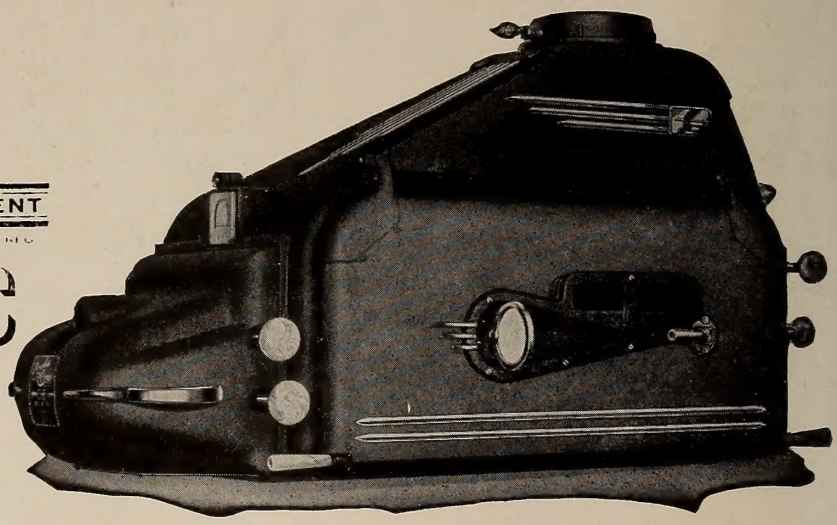
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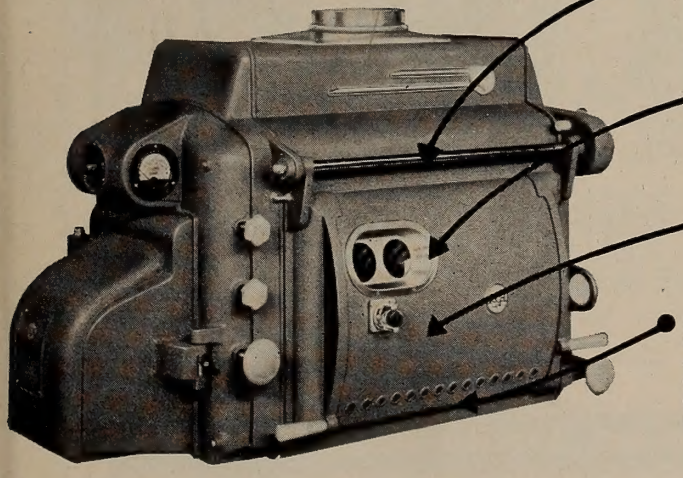
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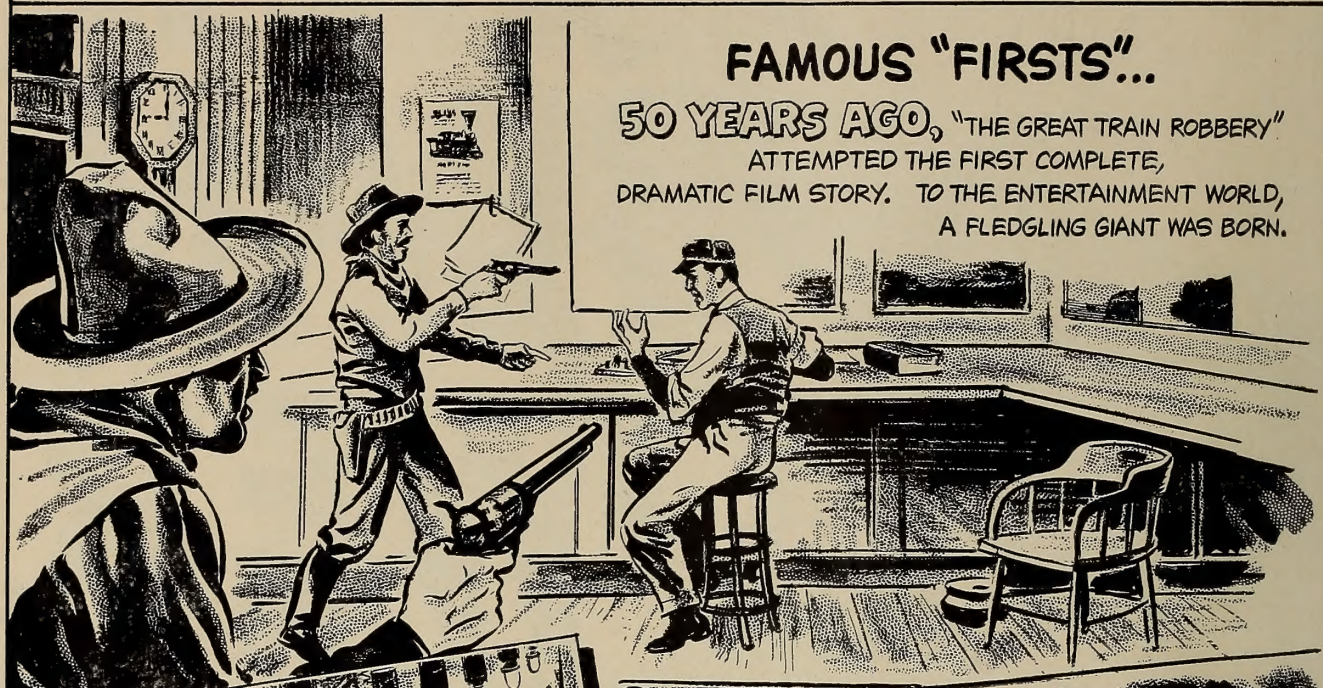
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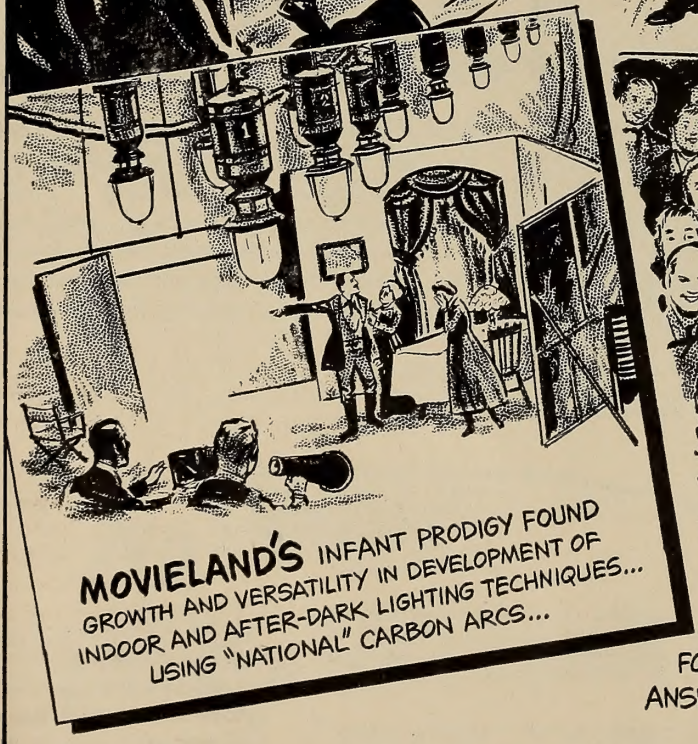
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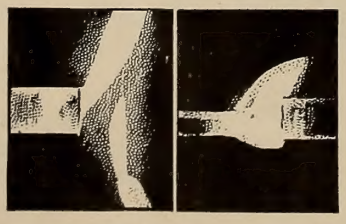




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INTERNATIONAL PROJECTIONIST

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FREDERICK HODGSON, *Editor*

JAMES MORRIS, *Associate Editor*

Volume 29 **JANUARY 1954** **Number 1**

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MONTHLY CHAT

AS 1954 opens the film trend is still towards the wide aspect ratio, stereophonic sound, more 3-D, and the ultra-skilled tub-thumping of 20th Century-Fox. One producer after another is jumping on the bandwagon, each whipping the horses in his own way.

International Projectionist, surveying the scene with what we fondly hope is editorial detachment, holds with Shakespeare that "the play's the thing" and that no amount of gadgetry can substitute for good pictures. Technological progress is inevitible, desirable and healthy but it must not be allowed to become an end in itself.

Illustrating the point in Columbia's "From Here to Eternity."

Here we have a picture, shot in standard black-and-white, that has been cracking boxoffice records all over the world. Why? The film does not have the advantage of Cinerama or CinemaScope novelty. Nor does it have the curious fascination of 3-D. Yet "Eternity" stayed at the 4,000-seat Capitol Theatre in New York for more than 20 weeks and grossed over $1,450,000. It broke all-time records in Tokyo, Japan, in Sydney, Australia, and in dozens of other cities abroad. It's well on its way to doing the same thing at the Marble Arch Theatre in London. At this writing the picture is playing a phenomenal 18th week in Washington, D. C. Even at the Shore Theatre, a Skouras house in Huntington, L. I., "Eternity" grossed $30,500 in one week.

What's the answer? Simply this:

A good picture will bring in the business — with or without 3-D, trick lenses or color!

"From Here to Eternity" is good enough to have won the top award of the New York film critics. It has been on every "ten best" list so far compiled, never below third place. And, according to those in the know, "Eternity" stands a better than even chance of winning the Academy "Oscar" in March.

True, Columbia did make an unfortunate bow towards the new processes by filing the aperture and showing "Eternity" at the Capitol in a ratio of 1.85 to 1, plus stereophonic sound. Most spots, however, are playing the picture straight.

Maybe, just maybe, the lesson of "Eternity" will be learned by the industry. Maybe, just maybe, 1954 will see the "sin" taken from CinemaScope and a move towards a safe and sane aspect ratio. Some projectionists, we're told, are filing apertures for greater picture height, rather than for width. Maybe, just maybe, this indicates that the trend has started. IP hopes so sincerely.

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INTERNATIONAL PROJECTIONIST

VOLUME XXIX JANUARY 1954 NUMBER 1

1954 Seen as Biggest Year for Color

Wide screen and 3-D systems need color to eliminate graininess and enhance entertainment values. This article covers the Eastman and Technicolor processes and discusses some projection and theatre lighting problems.

By JAMES MORRIS

DURING the year just past an important change has been taking place in the art of motion picture production, a change which has not received sufficient attention even from craftsmen within the industry because 3-D and CinemaScope have monopolized the limelight.

Partly because the new processes require color to maintain their effects of depth and realism, and also because Hollywood is generally making greater use of its technical resources in order to lure lost customers back into the theatre, about 75 percent of all films now planned or in production at the major studios are in color. This, of course, is exclusive of black-and-white films for television.

This estimate was made by Nick Tronolone, formerly president of Pathe Laboratories and now an independent consultant on motion pictures.

Color is Needed

"Use of color has been increasing at from 5 to 10 percent per year in the last five years with a big spurt during 1953," he said, "and its use will continue to grow."

An interesting point with regard to color and the new processes is the fact that the technical nature of wide-screen projection, whether it is accomplished by the CinemaScope system or merely by altering aperture plates and using a shorter focal-length lens, needs color to overcome the grainy effect resulting when 35-mm prints are blown up to giant screen sizes. This is in addition to the fact that color is needed for realism.

Situation Complicated

For the present at least, the color situation in Hollywood is complicated because the standard Technicolor "dye imbibition" method of printing cannot as yet be used to advantage on film photographed through a CinemaScope anamorphic lens.

This and other events of the past year have brought increasing popularity to the new Eastman Color which can be used as a complete camera and printing system, or in combination with Technicolor or other color processes. Ansco Color, a single-film, triple-emulsion color process, as is Eastman Color, has also been achieving wider usage.

Eastman Color has grown in popularity despite the fact that it is a more expensive process than Technicolor. At present if costs about $585 for a CinemaScope release print processed by Technicolor on Eastman Color film. Were Technicolor able to use its standard process on CinemaScope film, the cost would drop to $448 per print. However, the saving that Technicolor makes possible is true principally of heavy volume print orders.

Eastman Color is the process used in filming such CinemaScope productions as "The Robe," "How to Marry a Millionaire," "Beneath the Twelve Mile Reef," "Knights of the Round Table," and other pictures. Because of the increasing importance of color, projectionists may be interested in a general description of the Technicolor and Eastman Color processes and how they function.

Projection Problems

But, since the projectionist works in a theatre, he is primarily concerned with the technical problems of putting on a good show with the product received from Hollywood. If color is to become all-important in the motion picture business, the first question to consider is what procedures should be followed in the theatre if the best color projection is to be achieved. Technicolor, which has had a great many years experience in the processing of color motion pictures, has dis-

tributed information to projectionists on the handling of color film, and the subject has been covered in IP over the years in articles by Robert A. Mitchell and others.

It should be remembered that good color values cannot be obtained on the screen when light is discolored or not uniform. In an arc lamp that gives no better than 60- to 80 percent side-to-center distribution, color values on the screen are damaged. Red changes to terra-cotta, blue to steel-gray, and orange to brown. It has been standard practice in the past to process Technicolor prints for projection with high-intensity arcs capable of delivering ten or more foot-lamberts at the screen. Information about new-process light standards is not yet available from Technicolor, but it is reasonable to believe it will be substantially the same. If the illumination at the side of the screen falls far below the specified level, good results will not be obtained. A foot-lambert is a unit of measurement for the actual brightness of a screen surface.

An interesting sidelight to consider at this point is the suggestion that lighter-density color prints be used to obtain more light for beam-splitter 3-D projection. This is a highly questionable practice because with subtractive color processes such as Technicolor and Eastman Color, the color quality is directly related to the transparency of the film in such a way that really good color is available only with prints of high density. This will be true so long as dyestuffs that change saturation and hue with varying density are used for subtractive color processes.

House Lighting

It is regarded as bad practice to use any but absolutely necessary colored house lighting near the screen during the showing of a color film. The removal of red or amber decorative lighting in the auditorium is suggested to the extent possible under local regulations.

Color flooding of titles of Technicolor productions, either by projecting the title on a colored curtain or by using colored foot and strip light is bad practice because Technicolor titles are designed with care. Color-flooding alters the colors recorded on the film — colors which not only make the titles pleasing to see, but which harmonize the titles with the dramatic mood of the picture to follow.

It is also suggested that the projection arcs be struck two minutes before the changeover so that the discoloration produced by a cold carbon trim is avoided, and the arc be allowed to reach normal burning temperature before the changeover is made. Focus should be checked at the beginning of each reel.

Although it is only now coming to dominate American film production, color on the screen is, of course, far from new. The first color movie that could be run on a standard 35-mm motion picture projector without any changes or attachments was also the first Technicolor picture, "The Gulf Between," produced in 1917. Even this color system had been preceded as far back as 1909 by color systems such as the British Kinemacolor.

Color Before 1910

It may interest projectionists to know that Nick Tronolone, mentioned earlier in this article, was connected with the American affiliate of Kinemacolor and projected the first Kinemacolor showing in the United States before 1910, sweating over a hand-cranked projector that had to run at 32 frames per second — double the "silent" speed — to make the process work.

Kinemacolor used a red-and-green color wheel mounted on the projector and synchronized with the projector movement so that alternating film-frames, which carried red and green color values in black-and-white, would be in front of the proper section of the wheel. The red and green combined on the screen to give an effect of full color.

Mr. Tronolone, who is celebrating his 50th year in motion pictures during 1954, has worked in all technical phases of the business, projection and photography as well as laboratory processing.

Technicolor Processes

Dr. Herbert T. Kalmus, inventor of Technicolor, soon abandoned his first process, which made use of successive red and green tinted frames, when he decided that it was too crude. After the first World War he began to experiment with a subtractive color method which is the forerunner of the modern Technicolor process.

Two important developments came at this point. First, a split-beam camera was developed which recorded red and green color values on two separate strips of film. Then a subtractive rather than an additive color process was used by Dr. Kalmus in preparing the prints. A picture in natural color was produced on the print as well as the screen. In the previous additive process, then outmoded, white for instance, was produced on the screen by a rapid succession of colors. Curiously, in the color television of 1954 white is produced by a mixture of complementary colors. In the subtractive process, white is *white* on the finished print. This was a real landmark, not only because it improved the quality of the color, but also because the subtractive process permitted much more light to reach the screen.

In the additive process, such as the first Technicolor, alternate frames were tinted, or dyed, all over their entire area with the appropriate color — red or green. But in the double-print subtractive process developed by Technicolor about 1920, the black and silver were bleached out chemically from the two-color separation prints which were then toned to the desired color with the white areas of each print remaining free from color.

Two-Color System

Used in a picture called "Toll of the Sea," made in 1921, the above process differed from modern Technicolor in two important respects. It was a two-color rather than a three-color system. And, although it was a substractive system, the red and green color values were each carried on a separate film, both cemented together for projection. These double prints often buckled badly during projection.

It was "imbibition" printing (imbibition is a formidable-looking word that merely means drinking in or imbibing), developed for motion picture film the next year, that really opened the way for modern Technicolor. Instead of being toned or tinted for projection, the two color prints were converted into "wash-off relief" matrices.

These relief matrices, on which the raised gelatine image could be felt with the fingernail if it were run across the matrix film, were hardened and used in the imbibition printing process which is really not photographic at all but which resembles a lithographic printing process. The matrix bearing the red image, for instance, received or "imbibed" crimson dye from rollers with only the raised gelatine image

(Continued on page 31)

This Is the Second of Two Articles Covering—

Recent Projection Advances in Europe

European Developments, from the CinemaScope anamorphic lens to single strip 3-D, are revolutionizing American films: Here Mr. Mitchell looks at projection overseas

By ROBERT A. MITCHELL

IN THE DECEMBER *International Projectionist* various European projectors were discussed, and some emphasis was placed on projection lenses. This article, which concludes the present series, reports on optical soundheads overseas with special reference to photocells, on European projection lamps and on mirror and condenser systems.

The Ernemann sound reproducer, similar to the Ernophon S reproducer which may be attached to the back of any regular European projection head (shown in Fig. 3), departs widely from conventional American design. Unlike the heavy and complicated sound-heads with which American projectionists are familiar, the Ernemann, Bauer, and Europa-Klangfilm sound reproducers have no sprockets, no gears, no pressure rollers on the sound drum, and no complex rotary stabilizer. Such a reproducer weighs only 15 or 16 pounds.

"Braked Retard"

The film passes from the lower loop to a large idler roller, against which it is pressed by a rubber roller. This is the "braked retard" which filters out all intermittent flutters from the film. The film then passes around one or two rollers which smooth its motion still further, acting also upon irregularities of motion which might originate in any part of the film-course from the lower loop to the holdback sprocket. The sound drum, instead of being a plain cylinder which allows the film to be displaced sufficiently for scanning of the track, is a flanged roller which supports both margins of the film. Since the axial portion of the roller between the flanges has a small diameter relative to the diameter of the flanges (56 mm., or 2.2 in.), the scanning beam is not obstructed, but passes over it to the photocell. The film is quite tight over the drum, and since the flanges edge-guide the film, the tensioned inner flange pressing the film toward the soundtrack edge, no pressure guide-rollers are needed.

To the axle of the sound drum is attached a very accurately machined cup-shaped flywheel weighing 6 kilograms (13 lbs.) supported by two ball bearings placed at equal distances from the center of gravity of the rotating mass to assure an even distribution of the load.

Starting Speed

From 5 to 6 seconds has hitherto been required to bring the film at the scanning point to a perfectly constant speed when starting a projector. This was due to slipping of the film on the rotary sound drum caused by inertia of the flywheel. In the Ernophon S reproducer, however, the two rollers immediately above the drum are pivoted in such a way that both can be displaced against the action of an adjustable spring. The spring gives a lighter restoring force at small deflections than at large ones. And in order to reduce the swing of the yielding compensating device to a minimum of time, it is damped by a pneumatic dashpot.

When starting the projector, the double-roller equalizer is under the strongest pressure and moves downward to press against the rotary sound drum. The already large initial wrap of film around the drum is then further increased temporarily, increasing the friction between the film and the drum. The film cannot slip, but forces the drum to pick-up speed very rapidly. But as soon as the pull of the film decreases, when full speed has been attained, the rollers are lifted away from the drum automatically.

This arrangement permits the film to attain constant speed within 1 or 2 seconds, no disturbances of pitch being noticable at changeovers.

A double-roller compensator is used below the drum to filter out residual fluctuations in film speed caused by the lower sprocket of the projector and the takeup assembly.

Tube Is Small

The scanning-beam optical tube, although small, is fully corrected and highly efficient. Each of its several lenses is hard coated. The light output is high despite a slit image only 18 microns (0.7 mil) in width. This image provides better high-frequency response with less distortion than the 1¼-mil slit images often used in other countries.

Because the film is edge-guided at the scanning point by the flanged drum, the film being gently pressed towards the soundtrack edge to prevent any sideways wandering of the soundtrack, the slit in the optical tube is adjustable for length at both ends for correct centering upon badly displaced tracks as well as upon those positioned normally on the film. The longest slit image is 2.22 mm. (87.4 mils), while the normal length is 2.13 mm. (84 mils).

The photoelectric cell used in the

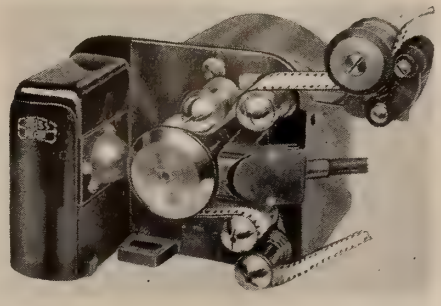


FIG. 3. The Ernophon S sound attachment for older European projectors. Similar to the sound take-off unit of the Ernemann IX and X projectors, this reproducer has no sprockets, gears, rotary stabilizers, or scanning-drum pressure rollers to mar its compact simplicity.

Ernemann and Ernophon S sound reproducers is an antimony-cesium blue-sensitive cell patented by Zeiss Ikon, but similar in response characteristics to the RCA photocell No. IP37.

Photocell Types

The regular-type photocell, having a cathode composed of a mixture of cesium and silver oxide coated upon a silver plate, is called a red-sensitive cell because it is most sensitive to red and infrared light, and responds only very feebly to blue rays. In fact, the sensitivity-peak of this cell, which is still the most widely used in all countries, lies in the invisible infrared region of the spectrum. Consequently, the red photocell works well only with silver-image tracks, not with colored-dye tracks which, if they could be used, would lower the cost of all types of multilayer, dye-coupler natural color prints. Silver images absorb red and infrared as well as all other wavelengths emitted by the exciting lamp, but dye tracks, no matter what color they may be, are quite transparent to low red and infrared radiation.

The blue cell is practically insensitive to red and infrared light, and thus gives excellent response with red (magenta plus yellow) soundtracks as well as with ordinary silver soundtracks. The Zeiss Ikon blue cell has, in addition to this property, superior electron-emitting characteristics and an exceptionally long life. There are, however, two disadvantages of the blue cell which will soon be mentioned.

Strontium Photocell

A strontium photocell having its sensitivity-peak in the green region of the spectrum is just now being developed in Germany. This green cell would work with magenta dye tracks, thus further simplifying the work of processing color prints.

Another solution of the problem involves producing a cyan dye which completely absorbs both red and infrared. While the common cyan dyes in use absorb "high" and "medium" red wavelengths very efficiently, most of them transmit bands in the low red and, what is more serious, practically all of the infrared emitted by an incandescent exciting lamp. If a perfect cyan dye could be produced, cyan tracks would give good response with the regular red-sensitive photocell.

It all amounts to making the soundtrack images "look" as dense as possible to the light-sensitive cathode of the photocell. To an ordinary red cell a dye track looks almost blank because the colored dyes, even when superimposed (cyan, magenta, and yellow) to look black to the eye, pass along waves which such a photocell readily perceives.

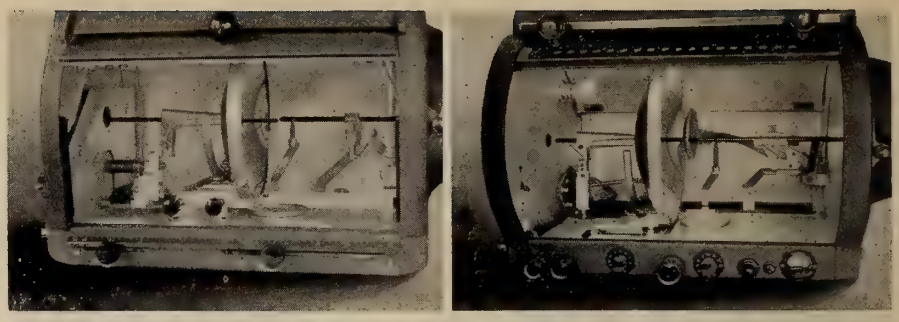


FIG 4. The Ikosol II (left) and Magnasol IV (right) convertible arc-lamps for both LI and HI operation at maximum optical efficiency. Note the clean design and centralization of controls.

To return to the blue photocell, we must point out that this type of cell, though very sensitive, is excited only by a very small portion of the rays emitted by the filament of an exciting lamp. Incandescent lamps give out mostly infrared, red, orange, and yellow rays, a fairly large amount of green rays, but relatively few blue and violet rays. And it happens that the intensity of the blue-violet radiation of an incandescent bulb varies much more than that of the red and infrared with fluctuations in the current which lights the lamp. This fact is revealed by a reddening of the light when the voltage is decreased.

Blue PC Faults

The sound-current output of a blue photocell excited by an incandescent lamp is therefore at the mercy of exciter-voltage fluctuations too small to affect the performance of a red cell noticeably. In theatres where line voltage is none too steady, the blue cell would behave very badly indeed and force the projectionist to stick by the volume control in an effort to maintain a constant level of volume.

Then too, we must take into consideration that the greater number of color prints in America are made by the dye-imbibition process (Technicolor), a method which is much less expensive than the use of multilayer dye-coupler color films. But imbibition printing, generally satisfactory for pictures, cannot be used for printing soundtracks because it involves a rather serious loss of image definition.

Satisfactory "resolution" is a necessity in soundtrack printing — a "fuzzy" track gives fuzzy sound, and no amount of electrical high-frequency equalization in re-recording can compensate frequencies which fail to print through in the projection copy. For this reason Technicolor films will always have to be made with silver soundtracks.

Small Preamplifier

The sound unit of the Ernemann X and IX projectors has a small preamplifier (visible in Fig. 2. *See December IP*) close to the photocell. This single-stage voltage-gain amplifier makes it possible to set up the main amplifier in any part of the projection room without danger of picking up noise or of attenuating the high frequencies. A preamplifier attached to the projector, it will be recalled, was employed in the very first Western Electric(ERPI) equipments; and most American manufacturers of soundheads now favor photocell coupling amplifiers.

Zeiss Ikon, the manufacturer of Ernemann projectors and sound reproducers, also makes "Dominar" theatre amplifiers, "Ikovox" speaker combinations, a separate cell-coupling preamplifier for use with earlier Ernemann models, or when the Ernophon S reproducer is used with other (European) makes of projector. Ernemann exciter rectifiers are part of the projector equipment, and in the Model X the rectifier is located in a metal drawer under the lamp table.

Dominar Amplifiers

The Dominar amplifiers require no detailed description, since their characteristics are very similar to the highest grade theatre amplifiers made in England and America. They have less than 2 per cent distortion, utilize degenerative feedback, and have frequency-response networks for adjusting to auditorium conditions. Noteworthy, however, are the very heavy

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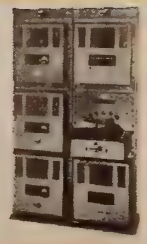
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IN-CAR SPEAKERS



SOUND SYSTEMS

MOTIOGRAPH

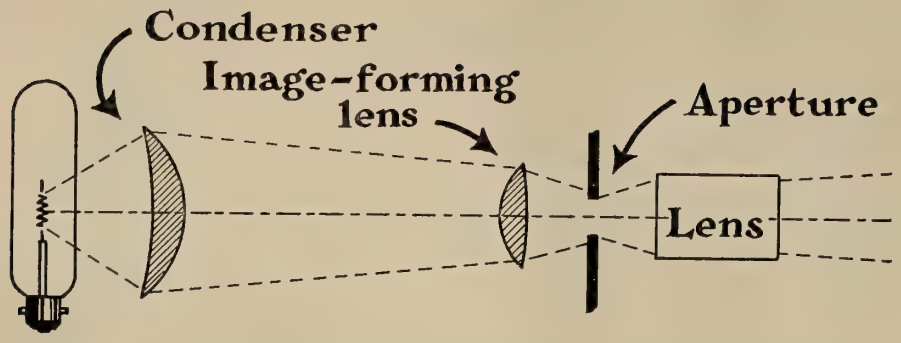


FIG. 5. The Koehler "intermediate-image" condenser system for incandescent portable projectors. The condensing lens, not the bulb filament, is imaged upon the aperture, hence uniform light.

and rugged electrical components which resemble those used in the American Motiograph - Mirrophonic amplifiers.

Ikovox speaker combinations, consisting of low-frequency dynamic PM speakers and cellular high-frequency horns in baffle cabinets, are quite like those put out in America.

The two latest Zeiss Ikon reflector arc-lamps are the Ikosol II for normal (low-intensity) carbons up to 35 amperes and for Beck (high-intensity) carbons up to 50 amperes, and the Magnasol IV for Beck carbons up to 80 amperes. These are illustrated in Fig. 4. Although these units resemble American simplified HI lamps in their general particulars, several significant differences require comment.

Instead of being placed at the extreme rear of the lamphouse, the mirror is positioned farther forward, as in the older American reflector lamps designed exclusively for LI operation. This position has always seemed desirable to the writer, for it permits better facilities for adjusting the mirror-aperture distance to obtain maximum uniform illumination on the screen.

Two Feed Motors

Although we do not find automatic "photronic" arc-positioning in these German lamps (a feature of several American rotating-positive lamps) the Ikosol II merits attention by having two separate feed motors, one for the positive carbon and one for the negative. This arrangement (of which we do not entirely approve) eliminates the need for differential gears and cams which, however, are found in the Magnasol IV. Because these lamps (especially the Ikosol II) may be used for LI as well as HI projection, the ratio of negative- to positive-carbon rates of feeding can be varied throughout an enormous range.

The controls of the Magnasol IV are neatly arranged on a panel beneath the door on the operating side, eliminating an array of knobs on the rear of the housing and permitting the projectionist to operate the projector without rising from his seat by its side.

The door of the lamphouse carries the crater screen as well as a dark-glass window, and is opened by sliding it up into the lamphouse. So also with the Ikosol II. The housing of both lamps is double-walled and well ventilated.

The Ikosol II, designed primarily for use with the amazing "Wabenkondensor" (Honeycomb Condenser) to permit even and uniformly white screen illumination with even the very lowest HI arc currents, and without much attention to the evenness with which the positive crater forms, has very few knobs. The mirror adjustments, moreover, are inside the lamp, and may be reached by raising the door slightly. We should not like this feature if we were operating the lamp without the Wabenkondensor, but with this special optical system the mirror adjustments need not be altered once they are set for maximum light.

Lamps Are Lighter

The first models of the Ikosol (not the present model) have been criticized by European projectionists for flimsy construction, and while it is true that German lamps are lighter and perhaps less substantially built than many American lamps, a high degree of ruggedness and mechanical stability is claimed for the Ikosol II.

While limitations of space prevent a discussion of the caboose-shaped predecessors of these modern German lamps (Magnasol I, II, and III, Ernesol, Kinesol, Artisol, and Ikosol I), attention is called to the influence which American lamp design has exerted upon the kerosene-drum shape of the lamp housing and upon such details as the carbon-consumption scales, arc-indicator screen, spatter-guard douser, and plain glass mirror shield (which, however, covers only the bottom portion of the mirror).

The mirrors employed in these lamps — 300 mm. (11⅞ in.) diameter for the Ikosol II and 356 mm. (14 in.) diameter for the Magnasol IV — are aspheric reflectors made of Ignal glass and notched out at the top (like the old Peerless LI reflectors) to prevent

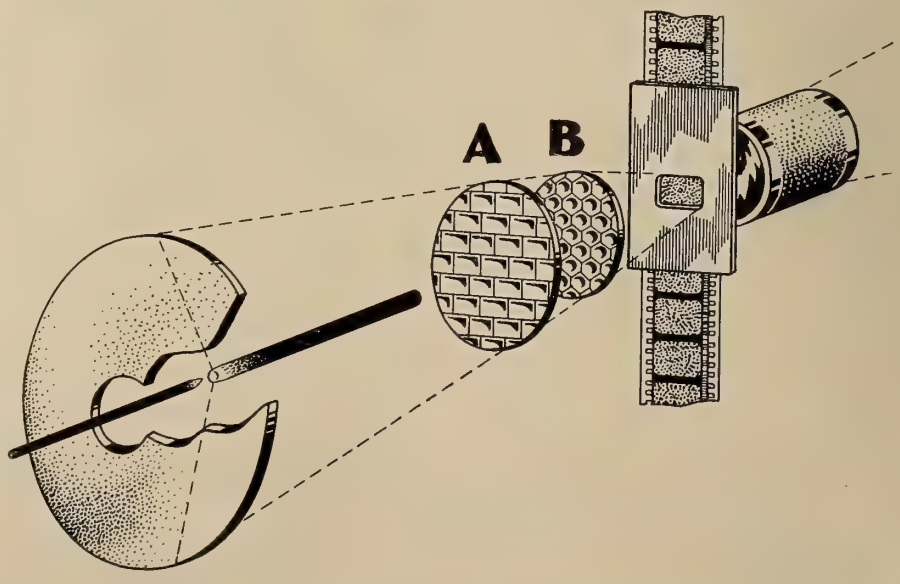


FIG. 6. The Wabenkondensor, or honeycomb condenser, a special modification of the Koehler principle for use with HI mirror arcs. The mirror is imaged by each rectangular lens of plate A upon each corresponding hexagonal lens of plate B. The lenses of plate B, in turn, superimpose the images of the rectangular lenses of plate A upon the aperture to give uniform brightness.

cracking due to the heat of the arc. When used in conjunction with the Wabenkondensor the side-to-center distribution of these lamps is 88% - 90%.

The theory of the Wabenkondensor was discussed in our translation and commentary beginning on page 5 of the April 1951 issue of IP. Now that the Wabenkondensor has undergone further development and has enjoyed wide and successful use in the field, a review of this ingenious optical system is again in order.

The Wabenkondensor

In principle, the Wabenkondensor is a special application of the Koehler intermediate-lens system used in German portable projectors to provide perfectly smooth screen illumination with incandescent lamps. Fig. 5 illustrates the Koehler system.

When an ordinary condensing lens is used, a more or less fuzzy image of the bulb filament is focused upon the projector aperture, and the field of illumination on the screen is accordingly marred by traces of the filament image. The Koehler system eliminates these inequalities of light by intercepting the beam with a second lens which forms an image of the evenly illuminated condenser upon the aperture.

Now, the center of the positive crater of a high-intensity arc is considerably brighter than the edges, the brightness-difference increasing with decreasing current. For example, the brightness of the edges of the crater is but 65% that of the middle at 50 amps., and only 45% at 25 amps., the lowest practical current for HI arcs. When this type of luminous crater is imaged upon the projector aperture, as by a conventional arc-lamp, we get a field illumination on the screen which is bright in the center and dim at the edges.

Secret Is "Honeycomb"

This disadvantage of HI projection could be overcome by the Kohler arrangement, imaging the uniformly illuminated mirror upon the projector aperture by means of a lens placed in the light-cone of the lamphouse. But, unfortunately, the hole in the center of the mirror, as well as the interposed positive-carbon holder, would cast shadows upon the aperture, making the light even more uneven. To make the Koehler principle applicable to the mirror arc, therefore, a new kind of lens had to be devised — the "Honeycomb" (*Waben*) condenser.

Fig. 6 is a diagram of the Wabenkondensor setup. The ordinary image-forming lens of Fig. 5 is replaced by two "lens-array plates" (*Linsenrasterplatten*) which consist of a large number (about 150) of single lenses which join each other without any gap (Fig. 7). The number and arrangement of these lenses is the same on both plates, but their sizes and

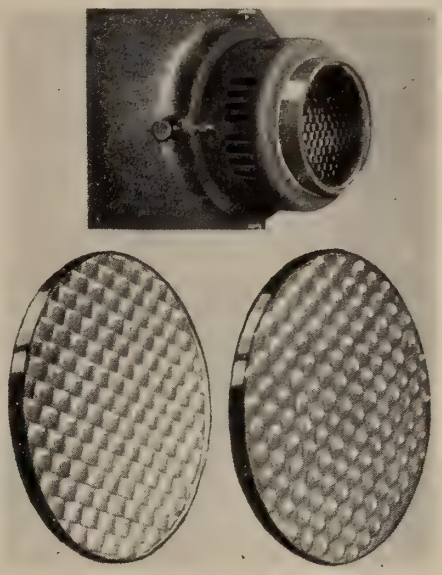


FIG. 7. The Wabenkondensor assembly in place in an arc-lamp. Pictured below it are the two lens-array plates: (left) the rectangular-lens plate, (right) the hexagonal-lens plate.

shapes are different. Each single lens of the lenticular plate A in Fig. 6 focuses an image of the mirror upon its corresponding lens in plate B. The lenses of plate B are hexagonal to conform to the circular form of the mirror image.

Each individual lens of plate B, in turn, images its corresponding lens in plate A upon the projector aperture. Accordingly, the lenses of plate A have an oblong shape of the 3:4 proportion to conform to the shape of the aperture. The total optical effect is the superposition on the aperture of about 150 different images of the oblong lenses. The partial shadowing of a portion of plate A by the positive carbon-holder can have no effect on the illumination of the aperture, which is completely even.

The Critical Distance

The distance between the mirror and the Wabenkondensor is not particularly important, but the correct, and very critical, distance separating the two lenticular reseau plates is maintained by their mount, which replaces the light-cone of the lamp. The distance between the projector aperture and the outer, smooth surface of the hexagonal-lens plate must be adjusted to 136 mm. (5.354 in.), with a permissible leeway of 1 mm. (0.039 in.). Under no circumstances should this distance be altered, for any change shows up on the screen as a loss of light or shadows at the edge of the picture.

It may seem that a little light might be lost by reflection from the surfaces of the two lenticular reseau plates, which is true; but these losses are minimized by the use of high-grade glass and antireflex coatings. But whatever the residual losses, they are more than compensated for by the efficient oblong shape of the spot of light on the aperture plate. A circular spot, as every projectionist knows, not only wastes a great deal of light, but heats the film gate (if not water-cooled) to an uncomfortably high temperature.

It has long been this writer's opinion that uniform screen illumination of the order of 90% - 95% side-to-center distribution is a necessity for first-class projection, and that the projectionist is severely handicapped in the practice of his art by the ordinary HI arc-lamp. There are several ways to produce uniform HI screen illumination, and the Wabenkondensor system is one of the more practical methods.

Efficient Illumination

What of the illumination efficiency of the Wabenkondensor? Does it increase the brightness of the picture or does it waste light? These questions can be answered on the basis of tests made with the Ikosol II lamp burning various HI trims with and without the Wabenkondensor.

In making these comparative tests the projector was run without film, a F/1.9 coated lens was used, the plate glass in the projection port was coated, and the lamp was adjusted for 75% - 80% side-to-center distribution of screen light without the antireflex-coated Wabenkondensor, 88% - 90% with it.

With a 6/5-mm trim burning 35 amps. screen light with the Wabenkondensor is 114% of the light without it. With a 6/5-mm trim at 40 amps. the light is 110%; with a 6½/5½-mm trim at 40 amps. 113%; with a 6½/5½-mm trim at 45 amps. 109%; with a 7/6-mm trim at 45 amps. 115%; and with a 7/6-mm

(Continued on page 28)

Color Is Catalyst in Battle of the Tubes

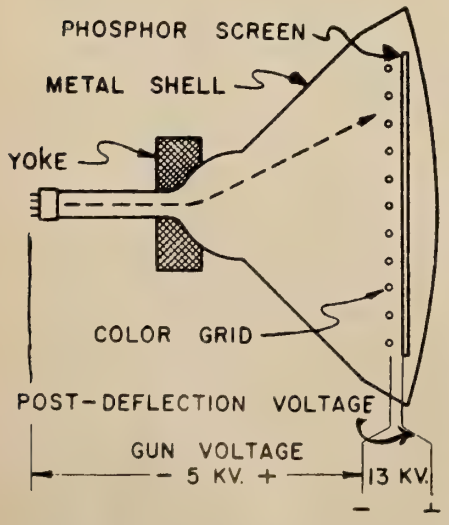
24-inch color television tube is already here. So claim the engineers who developed the unpublicized Chromatron. RCA and CBS vie in race for public favor as new medium gets FCC blessing

By FREDERICK HODGSON

COLOR TELEVISION has arrived officially — and with it comes the start of one of the most exciting races for preferred position since land-hungry settlers in the Old West careened across the plains in the sprint for the Cherokee Strip. The fun began on December 17 when word was flashed from Washington that the Federal Communications Commission had formally approved colorcasting under standards proposed by the National Television System Committee, an all industry group now well known by its initials, NTSC.

The new colorcast standards, replacing a previous set approved back in 1950 at the behest of the Columbia Broadcasting System with its now outlawed (except for closed circuit colorcasts) field-sequential system, permits reception of color programs on standard black-and-white sets.

In this article we are concerned principally with the "Battle of the Tubes," with the receiving end of color television rather than with the now satisfactorily settled issue of how to put the show on the air. This latter matter, of great importance to projectionists because of the increasing use of film both for broadcast and for rear projection in live shows, will be dealt with briefly later on in this piece and will be the subject of future IP attention.



This is a cross section of the Lawrence, single-gun Chromatron tube. Note how the electron stream inside the shell is deflected by the coil magnetic yoke. Note, too, the placing of the wires of the color grid in relation to the phosphor face plate. The 13 KV post deflection voltage varies.

The NTSC standards, now a part of the law of the land via FCC regulations, demand that any color television system be compatible, in other words that the 27,000,000 black-and-white sets now in use should not be rendered obsolete. The three types of tubes to be discussed here can receive in either black-and-white or color, a simple clockwise turn of the chroma dial on the receiving set changing a program broadcast in color from the familiar blacks, whites and grays to all the hues of the rainbow.

Three picture cathode tubes, or kinescopes, are major entries in the color television sweepstakes. They are RCA's tri-dot, three-gun kinescope, the one-gun Lawrence tube, also known as the Chromatron, and the three-gun CBS-Hytron, or Colortron. Engineers of the three developing companies quite naturally claim very special advantages for their respective brain children.

Let's look at this trio of entries in the contest of the cathodes, starting with a brief description of the RCA receiving tube. This kinescope was discussed in some detail by James Morris in an article on "Color TV . . . and How it Works!" in IP for September, 1953.

Basically the Same

Basically, the three kinescopes are the same. The differences, however, are of extreme importance because they will determine the winner, if any, in the race for public favor — and because the differences will largely determine how much you'll pay for a color TV set and how big a picture you will see.

Each of the tubes is of the vacuum type employing one or more cathodes, or "guns," to fire one or more electron beams at a phosphor plate. In the black-and-white phosphor plates the electrons, hitting the phosphor dots at high speed, cause these dots to glow with varying brilliancy. Hence you are able to see a picture. In color television the chemical composition of the dots has been changed so that they glow in color, also with varying brilliancy. In the case of the Lawrence tube, or Chromatron, there are no dots, phosphor strips are used instead of the dots.



Dr. Paul K. Weimer, RCA engineer, is shown holding an experimental single tube unit for the taking camera in the RCA tri-color television broadcasting system. Called an iconoscope, or orthicon, the tube is expected to do the work of the three tubes now used. The CBS system uses a single tube for broadcasting color, separating the three colors by means of a color wheel. Circuitry for the single tube is simpler than for three guns, according to both CBS and RCA engineers.

Mask versue Grid

The electron beams, or cathode rays, carry the color and picture information and, in accordance with NTSC demands, utilize black-and-white scanning standards, 520 lines at 30 cycles per second. Two of the kinescopes, the RCA tube and the CBS-Hytron, use aperature masks, each perforation positioned directly behind a phosphor dot. Electrons stream through the tiny holes of the plate, strike the proper dots and so produce the color picture. The Lawrence tube, using but one gun, actually bends the beams by means of an electrostatic "lens," a charged wire grid placed just back of the phosphor face plate. This "lens" system eliminates the perforated shadow mask.

The Lawrence tube differs from the RCA and CBS-Hytron in other ways as well. For example, the distance from the cathode to the phosphor plate

is much shorter thus permiting a much larger picture. First of these new tubes, now completely unknown to the general public, to go on the market will be as big as those now popular in black-and-white sets, 21 inches and 24 inches. The top picture size so far announced for the RCA tube is 16 inches, with the 12½ inch tube being widely publicized. A 21-inch tube has been announced by CBS.

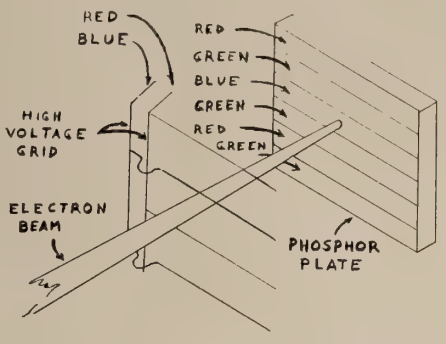
In the RCA tube the three guns are positioned inside a metal cylinder and converge at a narrow angle so as to aim three narrow electron streams at the perforated masking plate. The beams sweep across the plate, electrons streaming through the tiny holes to strike the phosphor dots and make each glow in its proper color. The magnetic deflection system in the tube, as in the other tubes under consideration here, is somewhat similar to that used in the black-and-white tubes.

An idea of the complexity of a cathode color tube may be gleaned from the fact that for the RCA 12½-inch picture size, the phosphor plate contains some 600,000 phosphor dots, 1,000,000 for the 16-inch. These are placed so closely together that the resultant picture is smooth. An analogy might be the photographs reproduced in IP as halftone engravings using a 120 screen. Examine one of these pictures under a magnifying glass and you'll see a myriad of tiny dots. Because IP is printed on an exceptionally fine grade of paper these dots can be smaller and closer together than is possible for a daily paper printed on newsprint. Newspapers usually use a screen as coarse as 60-line, or even 55-line. Use the glass to examine a photo in your favorite daily and you'll see what we mean. Another analogy might be the grain in film.

Midget Pictures

Some criticism has been leveled at RCA tubes, notably by Lee DeForest, and others, who say that the necessary metal shield adds unduly to the weight and also restricts picture size. RCA engineers, on the other hand, insist that there actually is no restriction on the ultimate picture size. However, the proof is in the eating, and any color TV we've seen on RCA sets has been of the midget variety, even in situations where the company was putting its best foot forward and would be expected to use the biggest screen possible and still have a good color picture. Too, RCA is known to be experimenting with one-gun tubes, even with the wire grid type of electrostatic lens as in the Lawrence tube.

In IP's humble opinion, subject to change as the inventive genius of



Above is a simplified sketch showing the passage of the high-velocity electron stream from the cathode of the Lawrence tube to the phosphor plate through the high-voltage grid, or electrostatic lens. Note that the two sets of grid wires (marked red and blue) are connected to two separate electrodes. In practice the grid is set but a fraction of an inch behind the phosphor plate.

engineers continues to perform electronic miracles, the most promising of the three tubes under discussion, for mass production and other reasons, is the Chromatron, or Lawrence tube. The public has been conditioned to big TV screens and may be expected to balk when asked to shell out anywhere from $500 to $1,000 or more for a TV set, color or not, with a picture size reminiscent of the early days of black-and-white.

The Chromatron was invented by a world-famous physicist, Dr. Ernest O. Lawrence, winner of the Nobel Prize for his invention of the cyclotron and other types of atom smashers. He is now director of the Radiation Laboratory at the University of California and consultant to Chromatic Television Laboratories, Inc. Dr. Lawrence was one of the top ranking scientists called upon for work on the atomic bomb. He is responsible for the development of the Calutron, the electromagnetic method for isotrope separation.

3-D on TV

The Chromatron, based on Dr. Lawrence's ideas, was brought to its present development by Chromatic Laboratories, a Paramount Pictures subsidiary headed by Richard Hodgson (no relation to the writer), a Stanford University engineer and wartime radar expert. We first saw the new tube at Chromatic's closely-guarded New York laboratory on the ninth floor of the Paramount Building. There we examined the electrostatic lens grid assembly and phosphor plate, heart of the tube. We mentioned to Albert Chesnes, a Chromatic engineer, that the assembly, with its grid of many hundreds of fine wires mounted just behind the phosphor screen, looked for all the world as if the lab were developing a motion picture screen for parallax barrier 3-D. Chesnes grinned, and let a secret slip. Just for the heck of it, Chromatic engineers had "broadcast" 3-D over the closed laboratory circuit. This, however, had nothing to do with the wire grid. Any color tube, RCA, CBS or Lawrence, can pick up perfectly good stereoscopic pictures of the anaglyph variety. Viewers, of course, must wear traditional red-and-green anaglyph glasses.

Later, still over the closed circuit, Chromatic engineers, for the benefit of IP and Henry Kogel, staff engineer for SMPTE, "broadcast" an analyph still picture. As in theatre 3-D projection using the anaglyph system, the original color picture reached the eyes through the "glasses" as a black-and-white picture. Without the red-and-green viewers the picture was nothing but a dark blur with red streaks.

3-D Importance

This completely unexpected blessing, or curse if one doesn't happen to like the third dimension in movies and shudders at the idea of its invasion of the home, is of real interest and may be of great importance. With 3-D projection of training films in industry and for military training purposes, rapidly gaining in use, along with in-plant television, the possibilities for development are obviously very great.

Up to this writing telecasting of 3-D has been impossible except under harrowing conditions. Several months ago we saw true 3-D on our home black-and-white television set in a broadcast from the University of Pennsylvania. The viewer stood with his back to the screen and watched the screen in a mirror held at arm's length. A piece of cardboard was then held vertically on a level with the nose, permitting the eye to get just one of twin pictures on the screen. We saw 3-D alright but wouldn't want to spend an evening with such dubious entertainment.

[TO BE CONTINUED]

The 3-D SCORE FOR '54

By THOMAS L. BURNSIDE

In or out of sync, the third-dimension business booms as single-strip and twin-film proponents view the New Year through rose-colored filters

WHAT with "Kiss Me Kate," "Hondo" and other 3-D features burning up boxoffice records all the way from the smog-ridden shores of California to the rocky coast of Maine, the backers of the third-dimension are happily looking forward to the sham and shekels of fifty-four.

Let's take a quick look at the 3-D picture before the stereophony horn-tooting and elbow-bending of New Year's Eve is forgotten.

To begin with, some sort of single-film system seems to be in the cards, despite the askance glances of some chief projectionists who are not too fond of the beam-splitting apparatus now being diligently peddled by a half a dozen companies.

Meanwhile, it's gleefully claimed that, as of January 1, some 5,000 theatres in the nation have been equipped for 3-D.

The Battle of Systems

Here's a quick run-down on the various single-strip 3-D systems in the nation as the film industry's most cock-eyed year got the hook from the wings:

VECTOGRAPH: This is a really promising single film idea, now being hatched by the Polaroid Corp., Cambridge, Mass. The picture-carrying emulsion is on both sides of the film base, therefore but one projector is needed. No projection filters are required because each side of the film is polarized oppositely. Viewers, however, are specific. Vectograph has just signed a royalty agreement with Technicolor. Watch this one!

MOROPTICON: This is the Matthew Fox tie-in beam-splitter system and was described in the December IP.

NORD: Like Moropticon, this is also a beam-splitter although the Nord people don't like that term, claiming it lets through more light than other processes of the same ilk. However, the prism apparatus is larger than the Moropticon and, because of projection room architecture, it is sometimes mounted outside the ports. It uses filters and requires audience viewers.

More Light Claimed

NORLING: Claims three times more light than other systems. Uses a double lens assembly attached to any standard projector. John A. Norling, the inventor, says it's not a beam splitter. IP holds, however, that if the light comes from one strip of film a beam must be split somewhere.

PHOTORAMA: Claims that no audience viewers are necessary. The system involves the ingenious use of a screen mounted on a concave frame. Doc Faige, director of Norpat, is interested in this one.

SYNTHETIC VISION: This is a beam splitter. Company tells IP it is getting set to demonstrate for the trade quite soon in Dayton, Ohio.

STEREOCOLOR: This uses a dual lens arrangement in the projector and, at no increase in sprocket speed, shoots 48 images a second at the screen. Roy E. Schensted, developer of this one-strip color system, claims his process gives the necessary solidity to the picture on the screen. Stereocolor has been demonstrated in Davenport, Iowa, and, while IP hasn't seen it and therefore cannot vouch for its value, engineers who have seen it say the thing really works.

Television 3-D

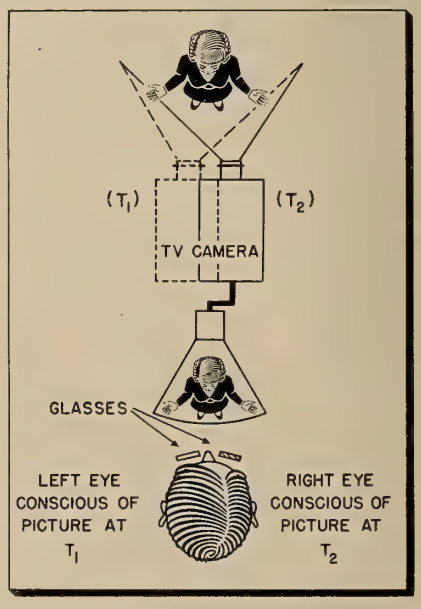
GENEOSCOPE: Primarily for television 3-D, this process is claimed by its sponsors to be applicable to theatres as well. In this system the viewer does all the work, wearing a pair of "shadow boxes" with lenses over each eye. One lens cuts down the speed of the light rays from the screen (that's what the man says!), the other letting the beam pass normally. The result is one image hitting the retina a split second before the other, thus giving the stereo effect.

DORSETT: This one, developed by Dorsett Laboratories for military use, is promised for some time in '54 but hasn't been released so far for mere civilians.

ASTOR: Uses a single film and a single lens on a special camera. Film speed in the taking camera is doubled and, so far as IP can find out right now, the printing process does the rest. Sponsors of the system, known as the "Astor 3-D Single-Camera Optical Unit," are R. M. Savini, president, and John C. Feys, vice-president, of Astor 3-D Films, Inc.

3-D SCREEN: Word from London has it that Boris Morros, who is demonstrating the Moropticon system in the British Isles, has got hold of a special multiple-screen system that will enable people to get the stereo effect without glasses. To IP, this sounds like another parallax barrier gimmick.

(Continued on page 27)



This is a sketch of the Geneoscope 3-D television system. The system, which the company says is adaptable for theatre use, requires viewers to wear "glasses," red over the left eye and yellow over the right. The red filter, according to the Geneoscope people, retards the chemical dilution of the red pigment of the eye's retina causing that eye to see the picture at T_1, a moment before the right eye sees T_2. Illustration is by courtesy of Tele-Tech.

What's Your Problem?

Projectionists whose problems appear below will each receive a $3.00 check from IP. We'd like to know "what's YOUR problem?"

Q. Perhaps you can help answer a small problem which should be of interest to other projectionists. Ashcraft lamps are well known the world over for their many fine features and here in New Zealand we have many of these lamps operating in numerous theatres. As you know, all good high intensity lamps have some means of projecting an image of the burning carbons onto a gauge card. Ashcraft lamps have an imager assembly but owing to the system used the projected image of the two carbons is upside down on the card. The projectionist is constantly looking at an arc in reverse. He has two carbon images to carry on the gauge card lines to be sure but it would be a great help to have the projected image the correct way up. The factory tells me that a small metal plate with a tiny hole drilled in it and placed an inch in front of the present lens will reverse the image. I've tried this and so far with no results. Perhaps you can tell me how the arc image can be reversed. Is it only possible by using two lenses? The present image magnification is okay, approximately twice actual size on the card. Douglas A. Harley, Chief Projectionist, Embassy Theatre, Auckland, New Zealand.

A. Reversal of the arc image is extremely simple, but for the life of us we can't see why you want to do that! The "picture" of the arc tail flame reaches the aperture in reverse, exactly the way you see it on your gauge card. Obviously you have an older Ashcraft lamp. These lamps had the gauge mounted near the top of the lamp house, with the lens and mirror assembly on a level with the arc. The newest lamps have the lens and mirror in the same place but the image-carrying beam is aimed forward and hits a small ground glass screen. The image is still inverted as it is on your gauge card. Apparently someone (Clarence Ashcraft swears he didn't do it!) suggested to you that you place a small pin-hole camera in front of your assembly. Yes, it should work. However, Mr. Ashcraft and your IP reporter ran a test at the Long Island City factory and successfully reversed the image by inserting a small (1" diameter) long focal length lens in front of the mirror. We held the lens about two inches from the mirror. The tail flame, right side up, was focussed perfectly on the ground glass screen. You can do the same thing with your gauge card, using a cheap lens from the corner optician and using your ingenuity to mount it in permanent position.

Anyway, as we see New Zealand from the antipodes in New York everything is upside down there. Or maybe, from the New Zealand point of view, we're standing on our heads in New York.

* * *

Q. Will you please advise me of the correct name and trade term for the F/1.9 projection mirrors that are used with F/1.9 projection lenses? The supply dealers in our territory have told the managers that there are no such mirrors. I will appreciate any information that you can give me on this. John Marks, Sec., Local 636, Lewistown, Penna.

A. The supply dealers your managers have been talking to must have rocks in their heads. Just to make sure that these mirrors are obtainable through dealers, IP did some checking in the New York area and they're buyable from any one of them.

However, you do not tell us what type lamp you use — and these fast reflectors cannot be used with most lamps because the mirrors are made only in 16" diameters and above. For example, the Strong "Mighly 90," and several other lamps can take a big mirror, the dimensions of the housing being big enough. If you have been using slower speed lenses and have now switched to the F/1.9, or even F/1.8, and are having trouble because of your 14" mirrors, things can usually be corrected by changing the operating distances within the lamphouse, the positioning of the arc in relation to the mirror and the lens, as an example. Your service engineer should know about this. Or you might write to the manufacturer of your lamps. Give him all details, including throw, screen width, etc. We can't help you very much from here because we lack the essential information about the situation, or situations, involved.

* * *

Q. I have been taking IP for only a short time, so maybe you have discussed this problem in earlier issues although I haven't heard about it. While I realize you cannot give me a solution for my problem, I am in hope that you could satisfy my curiosity by giving me a reason for it. I work for an organization which exhibits second- and third-run features. In many cases I will find almost the last 14 feet of a reel completely covered with all sizes, shapes and descriptions of cue marks. Why is it necessary for each projectionist to put on his own personal cues? Aren't the original ones sufficient? Dennis Lewis, 10337 Dante Ave., Oakland, Calif.

A. According to Mike Springer, chief projectionist at RCA's Johnny Victor Theatre in New York, projectionists should be happy to go by the Academy standard cue markings that are placed on all prints sent out by the studios to the exchanges and from there to the projection room. When, for some reason, extra cue marks must be made, they should be done neatly with a grease pencil or special marking device. Cue marks which scar or scratch the print are not only unnecessary but most unfair to those who must use the print afterwards.

Unfortunately there is a persistent feeling among some projectionists that their own specially-designed cue marks give a greater sense of security during changeover. These projectionists are said to feel that they are putting their signature on the film when they make their own cue marks, and they don't get the same feeling of security from marks made by somebody else. It is also true that a projectionist, faced with an already badly marked-up print, often has no choice but to add extra cue marks to avoid confusion. In addition, the standard cue marks may sometimes be very dim or even missing. IP is planning an article on this subject in the near future.

PERSONAL NOTES

DR. ALFRED N. GOLDSMITH, a co-founder of the 42-year-old Institute of Radio Engineers, will receive the coveted Founders Award of the IRE at the Institute's annual banquet in March at the Hotel Waldorf-Astoria in New York. The award is given only on rare occasions to outstanding leaders in the radio engineering profession. Dr. Goldsmith, a past president of the SMPTE, received the IRE Medal of Honor in 1941.

R. WILLIAM DASSOW has been appointed sales manager for the the theatre and television screen division of Radiant Mfg. Corp., Chicago, makers of the Astrolite screen. Mr. Dassow was formerly sales manager of C. Bendsen Marquee Co., and later part owner of several outdoor theatres. He was also associated with National Theatre Supply for 18 years, eight of which were with the New York branch and ten years as manager of the Chicago branch.



Old style shooting...

new style showing



"Law and lawless meet on the street and shoot it out." Time-honored script . . . new style, wide-angle handling—giant figures, cause-and-effect in action, sense of depth—all in one. Made for today's projection—sound and picture—on today's wider screens. Technical problems, there are . . . problems of film selection, processing and projection . . . problems which Kodak is helping the industry solve through the facilities of the Eastman Technical Service for Motion Picture Film.

Branches are located at strategic centers, inquiries invited.

Address: *Motion Picture Film Department,* EASTMAN KODAK COMPANY, Rochester 4, N. Y.

East Coast Division
342 Madison Avenue
New York 17, N. Y.

Midwest Division
137 North Wabash Avenue
Chicago 2, Illinois

West Coast Division
6706 Santa Monica Blvd.
Hollywood 38, California



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IN THE

SPOTLIGHT

THE BUREAU of National Affairs, a non-partisan research service, recently announced that paid vacations are now practically universal. The Bureau analyzed 400 current labor-management contracts, covering all fields, and found that paid vacations are provided in 98 percent of union contracts, compared with 90 percent in 1950. The most prevalent vacation formula calls for one week after one year's employment; two weeks after five years' service, and three weeks after 15 years. Vacation as an earned right for workers has become an accepted fact in unionized industries.

• Frank Kinsora, president of Detroit Local 199 for the past 20 years, has taken over the duties of ailing Roger Kennedy, the Local's business representative. Kennedy has been in failing health for the past few years, but was able to take care of his official duties until recently when his illness took a serious turn.

• The wage committee for Local 324, Albany, N. Y., recently concluded negotiations for a new contract providing members of the Local with $4 weekly wage increases, retroactive to September 1, 1953. A special feature of the new pact calls for an additional $7.75 per week when 3-D features are shown. IA Representative Joseph Basson assisted the Union officials in the negotiations.

• AFL unions have contributed $90,000 to the Truman Memorial Library at Grandview, Mo. It is estimated that the library will cost $1,750,000. AFL President George Meany is one of the trustees of the Harry S. Truman Library, Inc.

• Herbert Aller, business representative for Cameramen's Local 659, Hollywood, Calif., recently charged that documentary films are being produced for the U. S. State Department and the U. S. Armed Forces by non-union civilians, who have been given motion picture contracts by these government agencies. "Using non-union civilians to make pictures in this country for the State Department and Armed Forces is comparable to using prison labor to escape paying union labor scales," he stated. Aller promised to launch an investigation to find out if the purpose of this policy is to "undermine unions." He is arranging an early meeting with IA President Walsh for the purpose of further exploring the situation and taking necessary measures to counteract this policy.

We wish to extend our thanks to our many friends throughout the Alliance who so graciously remembered us with their beautiful cards during the Holiday Season.

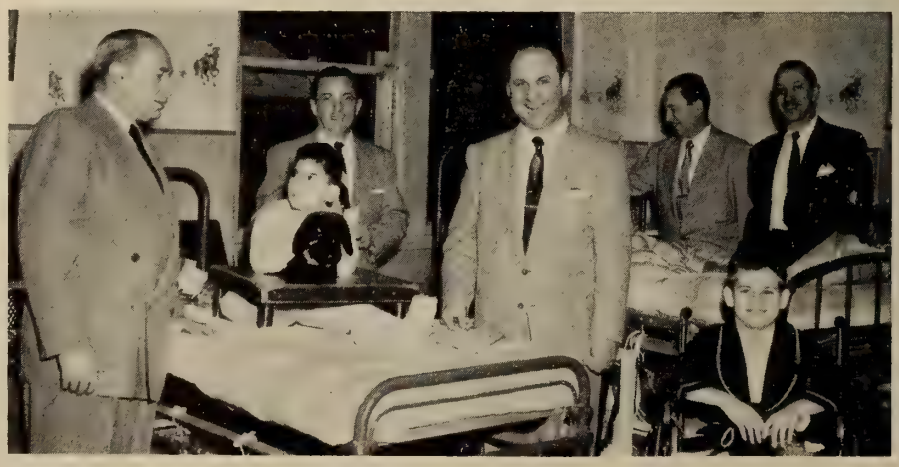
• A report in the exhibitor trade press relative to the decision handed down by the American Arbitration Board in the controversy between Los Angeles Local 150 and the Southside Theatres and the Fanchon & Marco circuit anent 3-D showings was so slanted as to appear in favor of the exhibitors. The following explanation, forwarded to this department by Charles Vencill, secretary-treasurer of the Local, puts a slightly different light on the ruling, to wit:

"Our contract provides for arbitration on conditions within the contract," states Vencill. "Southside Theatres and Fanchon & Marco tried to arbitrate something that was not in the contract, charging violation of certain clauses which in no way pertained to 3-D because there was nothing in the contract that mentioned 3-D.

"The Local held that the contract covered only flat pictures because at the time of the negotiations, 3-D was unknown and not discussed. Southside Theatres and Fanchon & Marco wanted to substitute arbitration for negotiations. The Local held that 3-D was not arbitrative under the terms of the contract. The Arbitration Board on a 2 to 1 decision upheld the Local's contention that the contract calling for one projectionist applied only to flat pictures and that 3-D showings were subject to further negotiations."

• Local 400, Alexandria, La., reached an agreement with the management of the Joy Twin Drive-In and the Joy Drive-In theatres in which the projectionists were given a 7½ percent weekly wage increase, effective January 2, 1954. Representing the Local at the negotiations were W. Martin Lip-

LOCAL 306 MEMBERS BRING HOLIDAY CHEER TO HOSPITAL PATIENTS



Members of the Movie Social Club of Kings County, which is comprised of members of New York 306, at the Hospital of St. Giles the Cripple in Brooklyn, N. Y., on Christmas day where they distributed gifts and brought entertainment to the crippled children. Harry Garfman (center), the Brooklyn and Queens business representative for Local 306, devotes much of his spare time to help bring a little sunshine into the lives of these unfortunate shut-ins. Club members assisting Garfman, as shown above are, left to right: Burt Sutter, Murray Berlof, Harry Weinberg, and Irving Meltzer.

scomb, business representative; Stewart E. Wilson, secretary, with IA Representative Albert S. Johnstone, assisting in the discussions.

• AFL and CIO leaders signed a "no-raiding" two-year agreement, in Washington, D. C., effective January first. Although the pact is binding only on the parent organizations, leaders of both AFL and CIO predict that the individual Locals will soon fall in line and sign similar agreements.

• An amendment requiring only one man in the projection room instead of the two-man law in effect for the past 20 years, was recently introduced before the St. Louis board of alderman. This bill is sponsored by a group of exhibitors who have long tried to reduce the projection room manpower and are determined to make the measure effective before existing contracts with St. Louis Local 143 expire, August 31 next. Needless to say, Local 143 officials are equally determined to defeat the bill.

• Evidently remembering the smart showmanship of Local 400 in spotlighting the Christmas parade of the previous year, the Alexandria (La.) Chamber of Commerce once again turned to the Local for assistance in staging the holiday parade last month. The Local's job was to highlight the Santa Claus float — a feature attraction of the parade. A Strong Trouper spotlight with a 50-60 foot throw, was bolted to the floor of a trailer that immediately preceded the Santa float so as to provide a steady light. Nine different color combinations playing on the float achieved a kaleidoscopic effect, producing a striking spectacle.

The Local received a rental fee for the use of the spotlight, and three men working the parade — Jerry Clark, Ralph Scott, and Earl Dupree — were well paid for their services. W. Martin Lipscomb, the Local's business representative, was in charge of all arrangements.

25 Years Ago—January 1929

• The IA General Executive Board donated $2,000 to the Gompers' Memorial Fund . . . Warnings were issued against a party who used the name of Lance and represented himself to be a member of Local 185, Spokane, Wash. On the strength of this false representation and forged documents, he borrowed money from the Local at Columbus, Ohio, and left the city before he could be apprehended by the police, presumably "working" his way East . . . This seemed to be open season for imposters — John Downs, claiming membership in Baltimore Local 181, appeared at several Southern Locals for the purpose of obtaining loans. The Baltimore Local denied Downs' claim of membership . . . Minutes of the Geneneral Executive Board meeting, held at the Hotel Roosevelt, New Orleans, La., November 19, 1928, were published in the IA Bulletin for January, 1929. Among the cases heard and acted upon by the Board were the following:

Request of Local 348, Vancouver, B. C. to transfer back to the First from the Twelfth District. Unanimously approved . . . Request of Local 289, Elmira, N. Y. to transfer from the Tenth to the Fourth District was denied . . . Appeal of Fred F. Heck, Local 157, Allentown, Penna., against action of the Local in expelling him from membership for violation of Local laws was denied . . . Local 376, Syracuse, N. Y. appealed for the reinstatement of member Robert Sardino, who had been expelled on complaint of Syracuse Local 9 for violation of International By-Law. Appeal was sustained and reinstatement approved . . . Eugene Klingensmith, Local 132, Niles-Warren, Ohio, appealed $10 fine for breaking Local laws. Denied.

Turn Your Projection Skills Into Cash!

Many things, from busted toasters, irons and radio sets, need fixing and offer ways to earn spare time pin-money.

By MICHAEL SMOLLIN

Member, Local 640, Nassau and Suffolk Counties, N. Y.

THE SPECIALIZED skill of the projectionist opens several avenues to sideline income. Many projectionists, including myself, earn extra money, sometimes in considerable amounts, by exploiting their skills outside the theatre. Following are some suggestions for those who like to employ their free time in profitable activities.

Careful analysis of sideline activities open to projectionists reveals three basic requirements:

(1) Your skill — this includes at least an elementary knowledge of electricity including Ohm's Law, the ability to use a multimeter, soldering iron, electric drill, tape and reamers. Also very important is your ability to find needed information quickly. This is your mental equipment.

(2) The second requirement comprises your stock of tools, some of which you probably already own and others, as previously mentioned, you can add as business warrants. You will need a "base of operations" — a room in which to keep your equipment and a work table.

(3) The third is a practical and regular method of going after business.

Let us take these requirements in order and examine them. Many of us learned our abc's of electricity by bits and snatches from various technical books and articles. Some of us, like myself, were fortunate enough to have to our credit a formal course in elementary electronics. A knowledge of Ohm's Law is very important. It is assumed that every projectionist knows this law in its algebraic form so that he can quickly and accurately determine, when necessary, the dissipation requirements.

Every projectionist should be able to use a basic test meter so that he can measure resistance, AC and DC voltages, current consumption, and make continuity checks. Perhaps my own best investment was the $20 I paid for a multimeter. If you can use a meter to tests for leaks and grounds in your lamphouse, you can make money outside the theatre.

The foregoing will take on their full importance when, for instance, the lady next door brings you her electric iron which refuses to work (and this is exactly how many of us started on the path to extra income). You check the plate marking on the iron, attach the meter prods across the plug prongs, set the selector for the proper range, and you will be able to see the

nature of the trouble. If the iron is rated for 1000 watts, your pencil and paper will give you the answer quickly, using Ohm's Law.

Repairing electric toasters, and table lamps offer another source of sideline income.

Record Players

You probably own a record player and you know from your own experience that sooner or later it will need attention. The manual type is very simple; the changer type is complex, particularly the three-speed variety. You should obtain servicing instructions for the changer in question and study them. The illustrations that are included with the instructions will enable you to grasp the sequence of operations and will give you a better understanding of the mechanism.

Your skill also includes the knowledge of circuits as used in your own theatre amplifiers. Many portable record changers with their own sound systems require frequent attention because the heat is contained within the cases. This heat destroys the lubricating qualities of grease and oil, turning them into sticky, gummy layers and interfering with the automatic operation of the machine. This is a very lucrative source of side-income, but you must know your stuff and give quick and efficient service.

The skill of the projectionist in handling film and projectors stands him in good stead in the 16- and 8-mm fields. The narrow gauge films are widely used now, especially in the educational and industrial fields, and a most satisfactory income may be delivered from the repair of these machines.

Best Wishes for a Happy and Prosperous 1954

to all our Friends from

PROJECTIONISTS LOCAL NO. 128

Boston, Mass.

Sound Projectors

In addition to portable sound projectors, the tape recorder is also becoming very popular in non-professional application. Both types of equipment are operated quite often by relatively unskilled persons and are bound to require attention by an experienced person sooner or later. Many projectionists own their own 16-mm equipment and profit by renting it out, with themselves handling the shows.

In checking portable projection systems, your procedure is much the same as with standard machines in the projection room except that some special stunts may be necessary. When testing for sound, for example, use a piece of thin paper to interrupt the x-lite beam. This is so that you can see the light, if it is present. This would not be possible with a thick card and your conclusions might be incorrect. With the volume control advanced, power on, you should get a plunk in the speaker when the x-lite beam is intercepted. Placing your finger on the grid cap of the first stage tube in the amplifier will result in a buzz in the speaker, if the amplifier is OK.

Portable sound movie systems are very tough and can take a lot of abuse. An extra PEC and x-lite are usually carried with each set-up. Exciter lamp failure is often due to a defective oscillator coil. Here your ohmmeter tells the story quickly — whether it is an open, short, or ground. If you are in a position to do this sort of work, you should obtain schematics for several makes and study them.

The thing that owners appreciate is resourcefulness in making the equipment operate by substitutes. Thus an x-lite in a portable movie system can be supplied with current from batteries appropriately wired to give the required pressure and paired off to give heavy current. In a pinch you can use a 50L6 output transformer as a step-down transformer to light the x-lite, but here will you run into a noticeable hum since a PEC has a high sensitivity to frequency change.

Radio Repairs

Radio repair work requires somewhat extensive equipment in the way of oscillators, tube testers, and analyzers. Custom sound installing does not require any great number of tools and the projectionist usually has the background needed for this work. Such work involves selecting an amplifier, a record player, and a speaker. Where a stereophonic or binaural effect is desired, a speaker system is necessary. Home decorating magazines provide good ideas on custom installations that can be "sold" to prospective customers.

Part of your equipment is your "caddy." This is a baggage type case with compartments in which you carry tubes, phono cartridges, a clean rag, extension cords, and other tools. A test meter, soldering iron, and socket wrenches are indispensable tools.

(Continued on page 26)

MAYBE THE UNITED NATIONS CAN SETTLE THIS THING?



By Louis Sumien, member of Local 640, Nassau & Suffolk Counties, N. Y.



Free Polaroid Land Camera

- The Picture-a-minute Camera -

for the best letters on

3-D

projection

If you're a working projectionist, if you know any 3-D tricks, if your ideas can improve stereoscopic projection, then you stand a good chance to win one of these camera beauties as offered by the Polaroid Corp. in cooperation with your magazine

THE Polaroid people think that America's much berated projectionists should be heard from on the third dimension. IP thinks so too!

So for three months, starting with the March *International Projectionist*, the Polaroid Corporation, in cooperation with IP, is giving one Polaroid Land Camera per month — *and for free* — to the working projectionist who writes the best and most constructive letter to the 3-D Editor.

Subject: 3-D movies and how to handle them.

Letters will be judged by a three-man panel consisting of Dr. Lewis Chubb, research physicist, Polaroid Corp.; Henry Kogel, staff engineer of the Society of Motion Picture and Television Engineers, and Frederick Hodgson, editor of IP.

What we want is simply this:

Your suggestions on how to make 3-D better. Any tricks you may have devised in your own projection room, tricks that improve your 3-D projection. For example, one theatre we know has an ordinary carpenter's spirit level handy so that the 3-D filters at the ports may be kept absolutely horizontal. If you've had a brain wave like that, send it in!

If you've found a way to out-smart the exchanges and their sometimes amazing inspection systems, let's hear about it!

In other words, if you, as a working projectionist, have an idea or a suggestion you think is good don't hesitate. Don't walk, run to the nearest mailbox.

You don't have to be a Hemingway. We don't care how the letters are written. It's the subject matter that counts.

Address your letters to the 3-D Editor, *International Projectionist*, 19 West 44th St., New York 36, N. Y.

Write as many letters as you like. And if you don't win the first camera, try again and you may win the second — or the third.

Incidentally, the Polaroid Land Camera is a honey. It's that famous new camera you've been reading about, the one that develops its own pictures in just one minute. The price, if you had to buy it, is a neat $89.75 (and worth every nickel of it!).

The Polaroid Land Camera gives you photography at its quickest, easiest and simplest. One adjustment takes care of all shutter and lens settings. All you do is snap the shutter, pull a paper tab and, voila, in one minute by the clock you have your picture. Prints are black and white and are big 3¼" by 4¼" — and they can be enlarged or duplicated, too, if you like.

So get you're letters in — fast! To qualify for March's camera your letter must be in the IP office no later than February 15th.

Here's wishing you luck!

Good projection is the key to good 3-D

More Small Houses Go Stereophonic

IF DOUBTERS there be as to the practicability of stereophonic sound equipment in small theatres they might ponder an installation now being made by National Theatre Supply. Walter Green, company president, tells of the installation in the pint-size screening room of a state censor board.

The tiny theatre seats 85 and the biggest screen the room can take measures 7 by 13 feet.

With the battle dust now settling as 20th Century-Fox and various recalcitrant exhibitor groups observe an uneasy truce, IP is receiving an increasing number of reports on installation of stereosound and CinemaScope equipment in the smaller theatres of the nation.

Family Size Theatres

National Theatre Supply, for example, announces more than 600 installations in family-size theatres, the neighborhood and small town houses that are the backbone of the picture business. Use of such equipment, of course, is now commonplace for the big movie palaces, the Music Halls, the Roxys and the other "Grand Central Station" theatres.

Motiograph sends along a list of 185 small theatres in which that company has completed the equipment job.

"And this list is for our company only," said Fred Matthews, of Motiograph, "and does not include Altec Service Corporation, RCA, Century, Simplex, Ballantyne, Ampex or any other company. These companies, as well as ourselves, are making installations or filling orders on stereophonic sound."

Pointing out that the most important elements of the CinemaScope process are a wide screen, plus true stereophonic sound, Mr. Matthews said that "these elements combine to provide the greatest approach to motion picture story telling ever achieved and the public has spoken for them by attending the theatres which are showing pictures filmed in this medium. The alert theatre owner who wishes to share in the receipts of the many great pictures to be produced for wide screen and stereophonic sound will make an early decision to properly equip his theatre."

Disclosing that his company has booked almost 700 orders in the past five months, Walter Green, of National Theatre Supply, said that a rapidly increasing proportion of these sales are to theatres in the 500 to 1000 seats bracket, with many in even smaller categories.

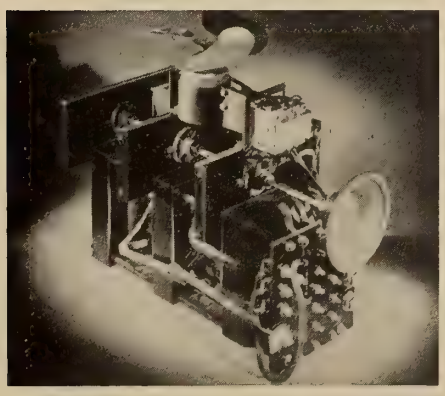
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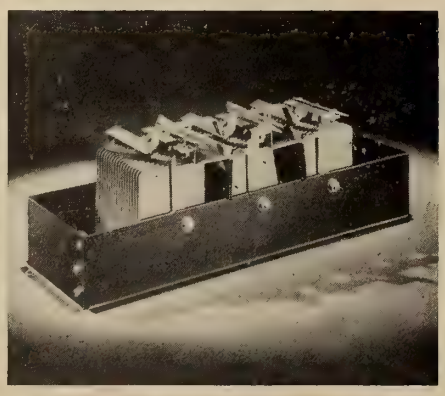
As to the 85-seat screen room for the state censor board, Mr. Green said his company had made exhaustive tests to determine the feasability of stereophonic sound in such a small theatre.

"The results were as effective and spectacular in this small auditorium as in the largest theatre," he said.

RCA installations are proceeding so rapidly that the company is sending equipment by truck from Camden, N. J., as far away as Michigan and Rhode Island. In one recent month, according to A. J. Platt, manager of RCA Theatre Equipment Sales, more than 100 independent theatres and five circuits, including the RKO and Stanley-Warner chains, placed orders with the company for stereo sound. Ampex, as reported elsewhere in this issue of IP, made 45 installations in the New York area alone in less than one month.

Strong Electric Has New Heavy-Duty Selenium Rectifiers





Above are two views of the components of the new selenium rectifier produced by the Strong Electric Corp., Toledo, Ohio. Described as extremely rugged and dependable, the rectifier is designed for use with high intensity projection carbon arc lamps pulling from 70 to 135 amperes. Two sets of transformer taps are provided for adjusting output current over a wide range of amperages and to compensate for variations in line voltages from 200 to 250. At left is shown the fan, switch and transformer and at right is the grid system.

1A ELECTIONS

LOCAL 150, LOS ANGELES, CALIF.

Wallace G. Crowley, *pres.;* Chas A. Vencill, *sec.-treas.;* Clyde W. Shuey, *bus. rep.;* E. R. "Sam" Pierson, *guide;* C. C. Bolinger, Virgil Crowell, John Sickinger, *exam. board;* Charles Bramel, R. L. MacDonald, Tom Ginthner, *trustees;* Al Adams, Harold Angel, Clem Marchand, George O'Brien, H. C. Smith, *exec. board;* A. Adams, W. G. Crowley, C. W. Shuey, Paul J. Mahoney, Magnus Nielsen, Geo. J. Schaffer and C. A. Vencill, *del. to IA Convention.*

The following were elected to the *board of directors* of the Local 150 Club, Inc.: A. Adams, H. Clay Blanchett, W. Crowley, M. Nielsen, G. Schaffer, C. Shuey, Leo F. Stockwell, C. Vencill, Harold Angel, R. L. MacDonald, P. Mahoney, and H. C. Smith.

LOCAL 173, TORONTO, ONT., CANADA

J. Sturgess, *pres.;* A. Kerrin, *vice-pres.;* L. Lodge, *sec.-treas.;* R. Higgins, *rec.-sec.;* P. Travers, *bus. rep.* (by acclamation); D. Siegel, R. O'Connor, L. Applebaum, R. Wilson, *exec. board;* T. Covert, J. Harris, E. Whyatt, *trustees;* S. Cohen, *sgt.-at-arms* (by acclamation); G. Robinson, *tyler* (by acclamation); P. Travers, J. Sturgess, G. Jones, and D. Siegel, *del. to IA convention.*

LOCAL 181, BALTIMORE, MD.

L. Sieber, *pres.;* H. Braswell, *1st vice-pres.;* C. Dotson, *2nd vice-pres.;* W. MacKinzie, *3rd vice-pres.;* T. P. Finn, Sr., *sec.-treas.;* C. Towers, *rec.-sec.;* C. Bayne, *bus. rep.;* H. Gentile, C. Grauling (chairman), R. Rushworth, *trustees;* E. Kastner, *sgt.-at-arms;* E. Eich, O. Niquet, *wage scale comm.;* C. Grauling, S. Isaacson, L. Sieber, *del. Baltimore Federation of Labor.*

LOCAL 253, ROCHESTER, N. Y.

Louis Levin, *pres.;* Joseph Pandina, *vice-pres.;* Lester D. Barager, *sec.;* Leon E. Burton, *treas.;* Fred E. Boekhout, *bus. rep.;* John Copple, *sgt.-at-arms;* Harry Levy, *trustee;* Frank Britt, Louis Goler, Floyd Spencer, Ernest Henley, *exec. board;* Joseph Vecchio, Sr., and Abe Orden, *del. Central Trades.*

LOCAL 348, VANCOUVER, B. C. CANADA

Douglas Calladine, *pres.;* W. McCarthey, *vice-pres.;* George Thrift, *sec.;* Ray Wardrop, *rec.-sec.;* Les Walker, *bus. rep.;* Gordon Sutherland, *sgt.-at-arms;* L. Walker, F. Smith, and D. Calladine, *del. IA Convention.*

OBITUARIES

FELIX D. SNOW, 66 , 3rd vice-president of the IA and business representative for Stage Employees Local, 31, Kansas City, Mo., died on Christmas day following a heart attack suffered the previous day. The day before he was stricken he was re-elected by acclamation as business representative of his Local, having held that post for the past 28 years. He served as a member of the General Executive Board since 1940 and up until the time of his death was the IA representative for the Midwest, spending a great deal of his time traveling.

Funeral services were held at the Freeman Chapel, Kansas City, on December 29. President Walsh and other top IA officials served as honorary pallbearers.

H. MERRILL YOUNG, 58, former secretary of Local 661, Reading, Penna., died recently after a six-months' illness. He began his projection career back in 1915 when he joined the Reading Local. Last summer he was appointed chief projectionist at Reading's Warner Theatre but illness forced him to give up the position shortly afterward.

Young was active in American Legion affairs, and was commander of Gregg Post, 1943-44. He was a member of Masonic Lodge 2, Reading Consistory; Rajah Temple, Tall Cedars of Lebanon, and Green Dragons. He is survived by his wife and daughter.

J. SIDNEY CRANS, business representative for Local 311, Middletown, N. Y., died several months ago at the age of 70. He joined Local 45, Newburgh, N. Y. in early 1900, transferring to Local 311 in 1923. In 1924 he was elected business representative of the Middletown Local, and served in this office until the time of his death.

ROBERT ANSETT, SR., 62, member of New York Stage Employees Local No. 1 died last month. He was a member of the Local for more than 40 years, and served as president for 10 years, from 1938 to 1948. At the time of his death he was a property man at the Roxy Theatre in New York, having held that position for the past 21 years.

JOHN FORD, member of San Francisco Local 162 since 1912, succumbed to a heart attack on December 28. At the time of his death he was employed at the El Capitan Theatre, where he worked for a number of years. He was an ardent IA man and was very popular in the Local. His sudden death was a shock to his many friends throughout the Alliance.

(The late John Ford is not to be confused with John A. Forde, present business represenative of the Local.)

Huff Announces New Nozzle

An improved nozzle for Huff Hydro Carbon Coolers is announced by the Hal I. Huff Mfg. Co., Los Angeles. The new nozzle is fitted with a high-refractory ceramic insert designed to increase its life. The ceramic insert acts as an insulator, minimizing the danger of arcing. All previous models of the Huff cooler can use the new nozzle.



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with SUPER SNAPLITE projection lenses



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New York Office: 30 Church St., New York 7, N. Y.

PROJECTION SKILLS

(Continued from page 22)

These you should own anyway. You may add other items as your business warrants, always using money earned on the side. Reference material is also important.

A word of caution about your stock — stick to profitable, often-called -for parts. Do not overstock. Find a source where parts may be obtained quickly.

Go After Business

Once set up and organized for some specialized work, your next move is to canvass your neighborhood. Stop at stores dealing in appliances and get acquainted with the owners. Leave your cards with people. In a small town you can carry a small ad in the local newspaper. Remember the value of advertising is cummulative; each time the reader sees your name, you become more strongly entrenched in his mind.

Last, but equally important, you should collect your money upon completion of the work. Where custom installation is involved, it is customary to collect about 60% of the figured cost as advance payment. This is necessary because components cut or drilled to special requirements cannot be returned for exchange.

The avenues to pin-money listed above are just a few of the possibilities open to the projectionist with time on his hands and the need (as who hasn't!) for some extra cash.

Film Pioneer Dies

George K. Spoor, 81, well known film industry pioneer,. died in Chicago on Nov. 24. The original Essanay Co. got its name from "S" for Spoor, and "A" from his partner, Gilbert M. "Broncho Billy" Anderson.

Born in Highland Park, Ill., and educated in Waukegan, Spoor entered the picture business in 1895 when he invested in a device called the Magniscope, a precurser of the motion picture machine. Essanay is credited with showing the first commercial 3-D films in the United States. That was in 1925.

The old Essanay studios in Chicago, together with Selig in the same city, gave many top stars their start, including Charlie Chaplin, Wallace Beery, Gloria Swanson and Francis X. Bushman. The studios closed in 1916 when the film industry center moved to Hollywood.

McAuley Lamp Booklets Ready

New booklets covering operating instructions and maintenance of the Peerless Magnarc and Peerless Hy-Candescent Cinearc lamp are now available from the J. E. McAuley Mfg. Co., 552-554 West Adams St., Chicago 6, Ill.

Heavily illustrated, the booklets cover such subjects as: setting up, voltage and amperage, electrical connections, lamphouse ventilation, carbon trim alarm, optical alignment, wiring diagrams, carbon holder sizes, and mechanism shutter alterations.

New Adjustable Lens

An anamorphic projection lens, said to be adjustable for five different aspect ratios, has been demonstrated in Hollywood by RKO Pictures. The lens, tentatively priced at a low $200, was designed by Joe Tushinsky, a studio technician.

The ratio, according to RKO claims, starts at 1 and can be moved up to 3 to 1, just about covering the field. RKO announces a companion "printing" lens capable of processing film into any ratio desired.

The trick lenses were produced by Tushinsky, formerly an independent producer, in collaboration with his brother, Irving. RKO backed the project and provided studio space for tests.

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30 years of "SCREENMANSHIP" pays off!

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Raytone is equal in MEASURE to any screen on the market today! Weigh all factors — and RAYTONE'S NEW HI-LUX SCREEN will emerge as the Exhibitor's choice!

1. **BETTER Light Intensity** for wide screen, 3-D and Anamorphic use.
2. Clearness of image, seamless construction
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HI-LUX Screens now available for any CinemaScope production. Now in use for CinemaScope in all sizes both large and small — will comply with all requirements for proper presentation. Accepted and preferred by leading Circuits and Independent Exhibitors!

RAYTONE SCREEN CORP. 165 CLERMONT AVE. BROOKLYN 5, N. Y.

THE 3-D SCORE FOR '54

(Continued from page 16)

We've had these before and they haven't worked.

MGM's NORMAL VISION: Dore Schary, production chief at MGM studios, has made the intriguing announcement that his company is experimenting with "normal vision," a process to "take up where 3-D left off." Based on "physiological principles", according to Schary, the system will require viewers to wear a new type of Polaroid glasses.

Research Council System

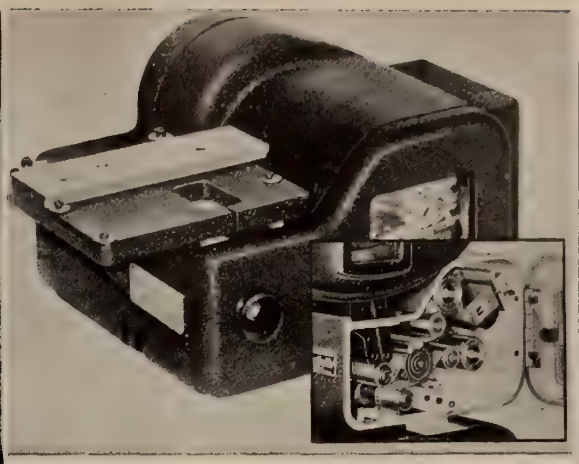
However, perhaps the happiest news comes from Hollywood where the Motion Picture Research Council, determined to bring some sort of sense into the chaotic scramble, is working on a single-film system of its own. The unit, somewhat larger than either the Nord or the compact Moropticon, has already been tested and reports are favorable.

William Kelley, secretary of the Council, sends along the information that the new single-strip system is currently being set up in the Academy Award Theatre in Hollywood. The film, says Kelley, is compatible with Nord's but not with Moropticon.

"We do not use a beam splitter," Kelley writes, "but separate the pictures after we are out approximately 8% to 10% of the throw."

Meanwhile, proponents of 3-D, particularly the people who sell viewers (principally Polaroid and Pola-Lite) are going to town with some top-flight promotion. Pola-Lite is backing a 3-D Council, a sort of chamber of commerce affair designed to push stereo. Polaroid is sending engineers into the field to show projectionists, and others, just how to keep two-strip in sync. The same company is making equipment available free to theatres. IP plans a story on this in the near future.

However, and quoting our contemporary, *Variety*, the situation in the single-trip 3-D sweepstakes is a "chicken or the egg" matter. Theatres are willing to sign up with Moropticon, Nord or whoever comes down the pike provided the producers will promise to make the films. Conversely, the producers are telling the exhibitors to install the equipment first. The question before the house seems to be: If the chicken does cross the road will she lay an egg?



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★ *Proven Performance!*

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PROJECTION IN EUROPE

(Continued from page 13)

trim at 50 amps. 109% when the Wabenkondensor is used.

In addition to providing screen illumination which is uniform in brightness and color, therefore, the Wabenkondensor actually increases the brightness of the picture!

Helps In Small Theatres

The very small theatres which are so numerous in Europe find in the Wabenkondensor a perfect solution to their lighting problems. Beck (HI) arcs consuming less than 35 amps. are not ordinarily feasible because of their extreme "hot-spot" characteristics and discolored light. Now, the Wabenkondensor permits the use of Beck arcs drawing as little as 25 amperes because it insures screen light which is perfectly uniform both in brightness and color. This is one of the "selling points" of the Wabenkondensor, though the writer must admit that he is not able to vizualize a theatre screen so diminutive as to be excessively bright with a 35- or 40-amp. Beck arc. It is always a good thing to have plenty of light to spare; and when there really is far too much light, a contrast-enhancing gray screen may be used.

The Wabenkondensor is intended for HI lamps only, and may be used with arcs of any power up to 50 or 60 amps. before the danger of cracking the lens-array plates becomes really great. The projectionist who is lucky enough to have the Wabenkondensor as a component of his lamp equipment can forget his mirror and carbon adjustments — almost. The light remains unform in brightness and color even when the crater burns at quite a slant, though it is hardly necessary to add that for the brightest light it is still necessary to maintain a crater formation sufficiently good to prevent the glowing gas ball from streaming off in the tail-flame of the arc. But most startling of all is the fact that the amount, uniformity, and color of the screen illumination with the Wabenkondensor remains practically constant when the arc is moved to and from the mirror through a considerable range.

In addition to the regular Ernemann Model X projector, there is a

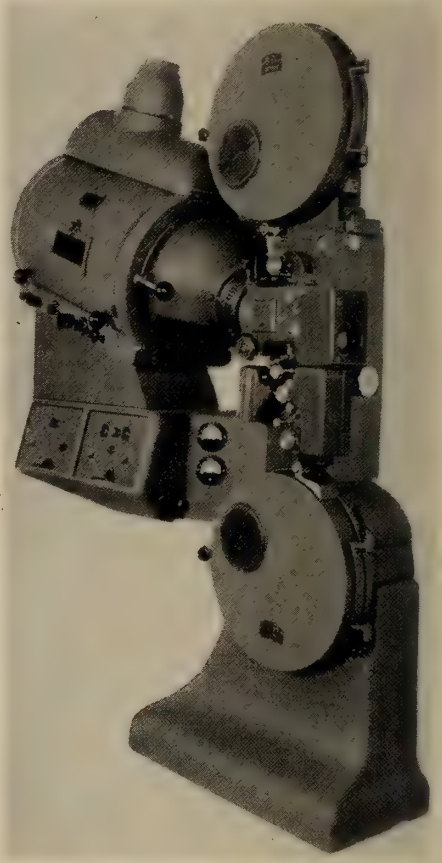
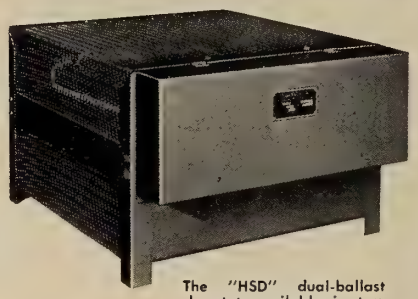


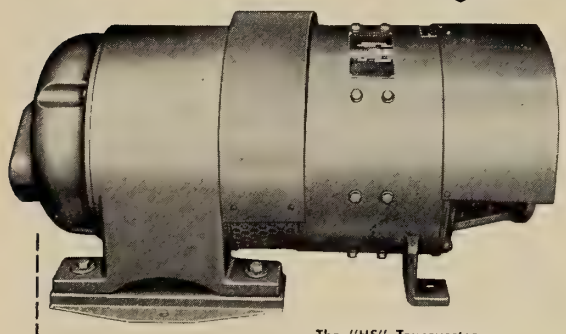
FIG. 8. The Ernemann X modified for undistorted projection at a 22° tilt. This projector was first built to order for the Eidgenossische Technische Hochschule, Zurich, Switzerland, where it is now giving satisfactory performance in the new physics lecture room.

Wide Screen Projection Requires More Light... Get an "HS"

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The "HSD" dual-ballast rheostat available in two capacities — 65-100 amperes and 5-51 volts; 85-115 amperes and 5-25 volts.



The "HS" Transverter 115/230 amperes



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to Meet THIS INCREASED POWER REQUIREMENT

- Exhibitors everywhere are finding out that wide screen equipment requires increased amperage for proper screen illumination.

Loss of light through use of filters plus giant screen sizes makes existing projection equipment inadequate to do the job.

Additional power is a must, for carbon-arc amperage and voltage requirements have been increased up to 100% for wide screen projection.

In order to get this increased power, get a Hertner "HS" Transverter.

When you buy a Transverter you are obtaining a power conversion unit that has been the standard of the industry for nearly half a century.

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specially designed Model X which has no counterpart in the projection apparatus produced by any other manufacturer. It is intended solely for undistorted projection at steep angles. This machine is shown in Fig. 8.

It is common knowledge, even among the uninitiated, that an excessively large projection angle results in a picture having an exaggerated vertical dimension and a distorted shape due to increased width of the picture toward the bottom of the screen — the so-called "keystone effect." The upper drawing in Fig. 9 illustrates the conditions which prevail when a conventional projector is pointed downward at the screen.

The keystone effect (which, by the way, is seldom visible from the projection room) is not troublesome if the tilt of the projectors does not exceed 10 or 15 degrees. A greater projection angle results in distortion that spoils the cinema patron's enjoyment of a motion picture. Tilting the screen backwards at the top is a common remedy, but it has the disadvantage of making the picture look "askew"

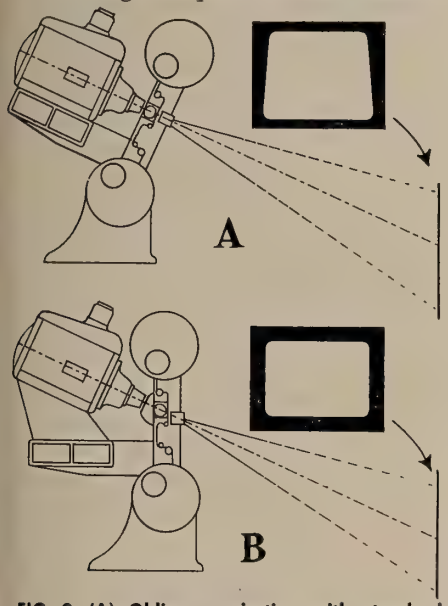


FIG. 9. (A) Oblique projection with standard projector results in distorted picture. (B) The Ernemann X modified projector makes possible oblique projection free from the "keystone effect." Note that the film gate is parallel to the screen, and that the optical axis of the lens is perpendicular in relation to the film-plane.

to patrons at the side of the auditorium.

The Zeiss Ikon works at Kiel attacked this problem on entirely new lines when the Confederate Technical College of Zurich, Switzerland, required for a certain auditorium an undistorted screen image at a projection angle of 22°. The first step taken by

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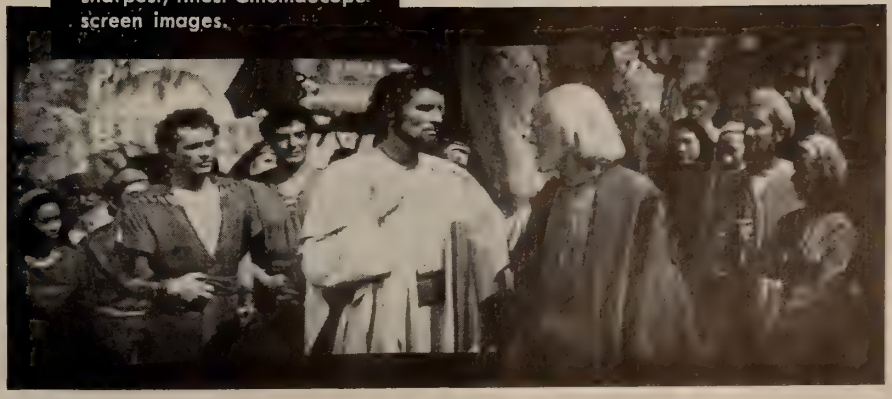
Now . . . the *one* lens series that gives you today's brightest, sharpest image on any screen: CinemaScope, 2-D, expanded 2-D, and 3-D! Finest edge-to-edge definition ever achieved. White glass— no color absorption . . . transmits full image color and brightness. Fastest projection lens made. Complete range of focal lengths. You're all set *now* and throughout the foreseeable future with this revolutionary new *f*/1.8 series— new world's standard for the motion picture industry.

Exclusively Recommended for CINEMASCOPE

20th Century-Fox recommends the new B&L *f*/1.8 Super Cinephor projection lens with B&L anamorphic adapter *exclusively* for clearest, sharpest, finest CinemaScope screen images.

WRITE for complete information. Bausch & Lomb Optical Co., 61625 St. Paul St., Rochester 2, N. Y.

Scene from "THE ROBE," 20th Century-Fox CinemaScope Epic



Zeiss engineers was the development of a suitable lens — the Alinar II. The next step involved modification of the Ernemann X to conform to well-defined theoretical principles.

Keystone distortion is completely avoidable when the plane of the film remains parallel to the screen even when the machine is inclined, as shown in Fig. 9.

In such a case as this, the projection lens must be positioned so that its optical axis is perpendicular to the film-plane, but moved downward to a point specified by optical considerations. Only when these conditions have been met can the whole film-photograph be reproduced sharply.

Required New Lens

It can be seen at once that the image-forming light rays enter the lens obliquely, requiring the lens to reproduce a flat field over a very wide angle. Ordinary projection lenses are not suited to the job because they normally cover only the 10° to 15° necessary for the standard film picture; but at an inclination of 22° an angle of about 50° is required. So large an angle of view must not be achieved by decreasing the "speed" of the lens, forasmuch as it is not advisable to abandon the speed of F:2 which is nowadays the customary speed of 35 mm projection lenses. Because a rather long focal length has to be retained, this difficulty is the main reason why the problem of distortion-free oblique projection had not been solved previous to the creation of the Zeiss Ikon Alinar II lens.

As the Ernemann X has removable base plates for components on the operating side of the mechanism, all of the alterations required for oblique projection could be made in the upper base plate, the rest of the mechanism remaining unchanged. The position of neither the cylindrical shutter nor the film gate was changed, though the aperture-window and the lens were lowered to new positions in accordance with the projection angle. The lamphouse was placed upon an intermediate inclined support fastened to the regular lamp table.

As a result of the oblique passage of the light rays through the lens, the field of light projected upon the screen showed a fadeaway from top to bottom owing to the natural vignetting of the lens. This unevenness of screen illumination was completely overcome by a special arrangement of the Wabenkondensor optics.

Furthermore, the oblique transmission of the light within the lens necessitated an adjustment of the position of the film plane in conformity to the mounting of the lens, as the depth of focus of these lenses is extremely small.

The film gate, therefore, has been so arranged that it can be inclined within a very small range in order to place the running film into the most favorable focal plane.

Tests with the new projector met all demands and produced an undistorted, well-illuminated image on the screen with sharp definition over the entire image-field.

[THE END]

Closed Circuit TV

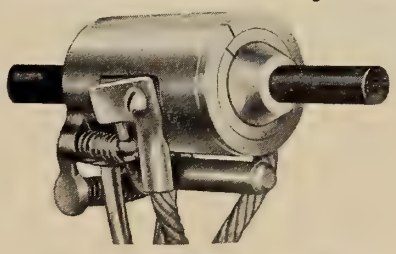
Closed circuit theatre television is being used this month by National Dairy Products to present its advertising and promotion plans at a series of sales meetings in a number of cities. The program, produced by Alexander Leftwich and handled by Theatre Network Television, is shown during off hours at the various theatres.

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BIG YEAR FOR COLOR

(Continued from page 8)

picking up the dye, the amount depending on the thickness of the gelatine.

Matrix Carries Color

As the process was carried out, clear gelatine-coated release stock was impressed against the matrix film in exact registration by rollers and by sprocket teeth that are the exact shape and size of the film perforations. The same procedure was followed with the other color to be printed, each dye being "imbibed" by the release print.

The Technicolor positive was ready for projection as it came from the printer. A large number of positives could be printed from a single set of matrices, and when these wore out, a new set could be made from the camera negative.

The basic improvement made in Technicolor after this period was to convert it from a two-color to a three-color process. This was accomplished shortly after the advent of sound when Dr. Kalmus again became dissatisfied with his process and decided that a two-color system was no longer adequate. He devoted himself to the building of improved Technicolor cameras and processing machinery. The first full-length Technicolor film to use three colors was "Becky Sharp" in the early 30's.

The standard method of filming in Technicolor now involves a special camera which also makes use of the beam-splitting principle. However, even though three separate negatives, one for each primary color, are used in the Technicolor camera, the beam-splitting prism produces only two identical images of the scene being photographed.

Prism Splits Beam

A prism of special design is positioned directly behind the lens. Part of the light passes straight through the prism and through an emeraude or greenish filter where the green color values are recorded on a film. The remainder of the light from the lens is reflected at a right angle to form an image of the scene in the second aperture. In this aperture, two negatives run together in a double pack. The first film in the pack records the indigo color values and the rear film records vermilion light through a continuous vermilion filter that runs between the two films in the pack.

A number of less drastic but important improvements have been made in the Technicolor process in recent years. One is the method of using the process for color film shot in a single-film standard motion picture camera with "monopack" color film. How this process records a scene in full natural color will be described along with the new Eastman Color process which also is a monopack process.

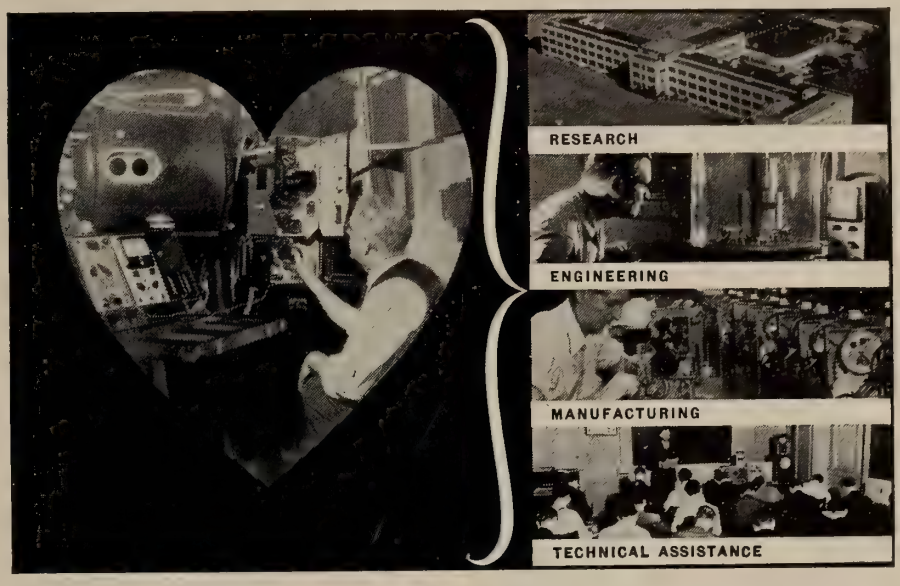
Eastman Color film, is fast gaining in popularity, both because of its

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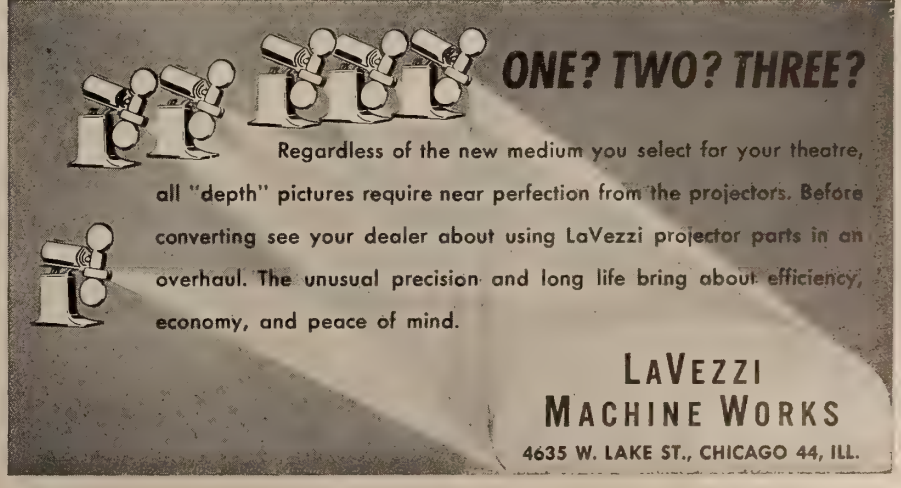


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adaptability to CinemaScope and because it can be handled by a great many processing laboratories in contrast to Technicolor prints which, up to the present, can be processed only by Technicolor laboratories in Hollywood and London. Technicolor, realizing its disadvantage on this score, has just entered into an agreement with the Deluxe Laboratories in New York for the processing of Technicolor prints on the East Coast. Another laboratory is planned for Paris.

The Eastman Color negative — consists essentially of three light-sensitive emulsions, each sensitized differently and coated on a safety support. Incorporated in the emulsion layers are dye couplers which react simultaneously during development to produce a separate negative dye image along with the silver image in each layer. The silver images are removed later by bleaching. Two of the dye couplers are themselves colored.

The original color of these couplers is discharged during development in proportion to the development of the emulsion. The remaining colored couplers serve as automatic color correcting masks to aid in obtaining good color reproduction when the color negative is printed on the companion product, Eastman Color print film or on other color materials.

The color print film is a multi-layer color film intended for use in making color release prints from the Eastman negative. It is also used in printing from black and white separation negatives such as the Technicolor process.

Three Emulsions

The Eastman Color print film consists of three light-sensitive emulsions, each sensitized differently and coated on a safety support. Incorporated in the emulsion layers are dye couplers which react simultaneously during development to produce separate dye images with the silver image in each layer.

The silver image is later removed by bleaching, leaving only the dye images in the picture area. The soundtrack area is redeveloped to give both a dye and silver image for the track. Since the material is exposed through a color negative (or from black and white separation negatives with colored light) the resulting images are color positives.

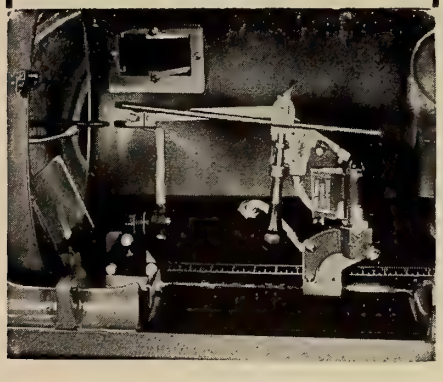
In conclusion it can be stated that color motion pictures have become more important than black-and-white in the Hollywood scheme of things. So far as competition between color processes such as Technicolor and Eastman Color is concerned, it is considered likely by such observers as Nick Tronolone that both will be important in the future.

It is likely, he said that Technicolor will be able to solve the problem of adapting the dye-imbibition process to CinemaScope. In addition, Eastman Color, which is constantly being improved and which can be processed in the studios' own laboratories, has the advantage of offering greater freedom and control over the production process.

TV Booms in Britain

More TV sets than radios are now being manufactured in Great Britain. During the first nine months of 1953, some 728,000 video sets were made compared with 706,000 radios.

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January to December, 1953

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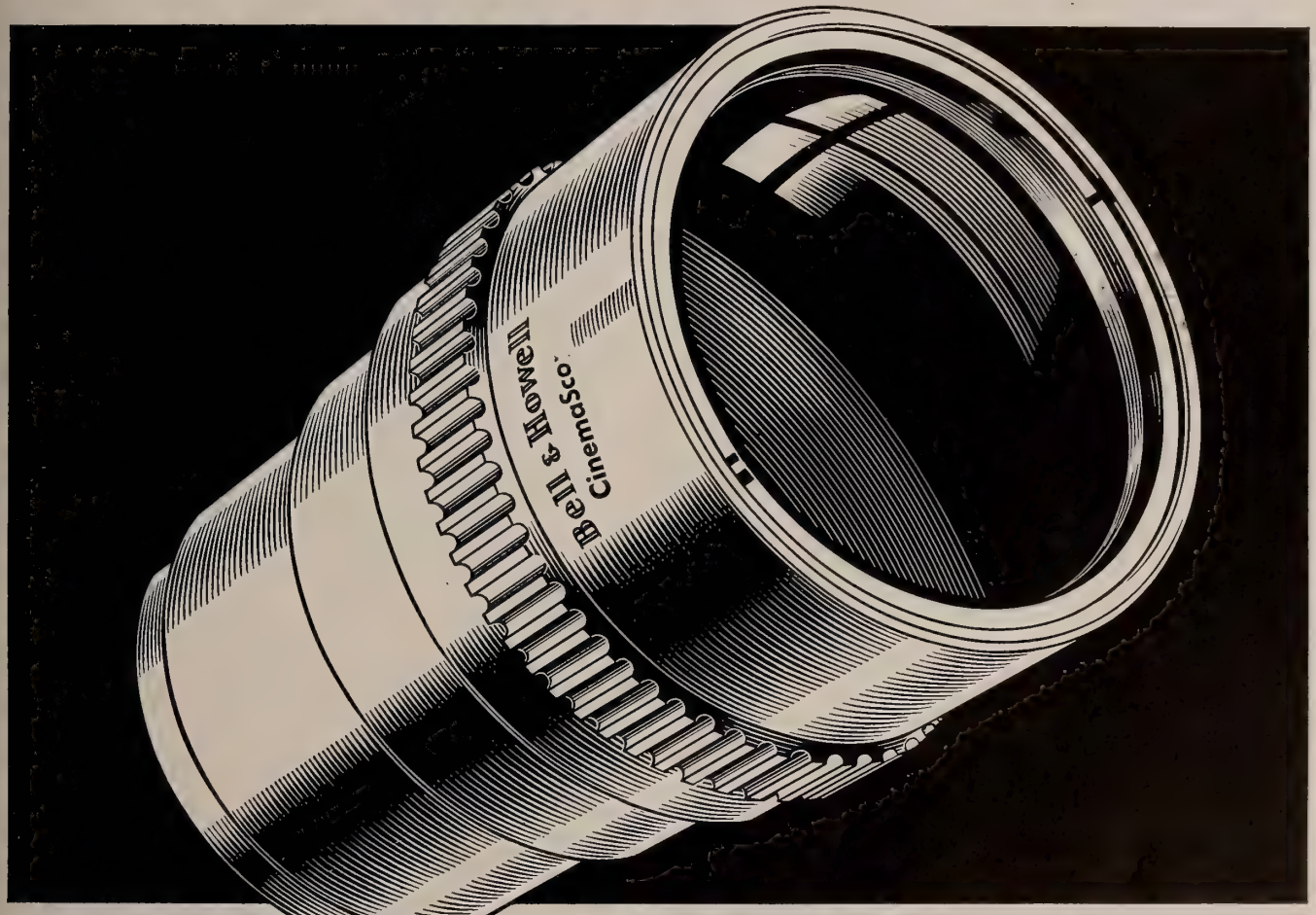
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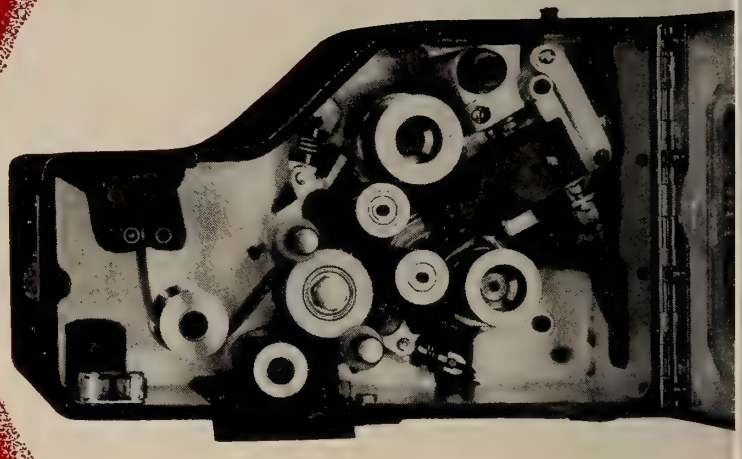
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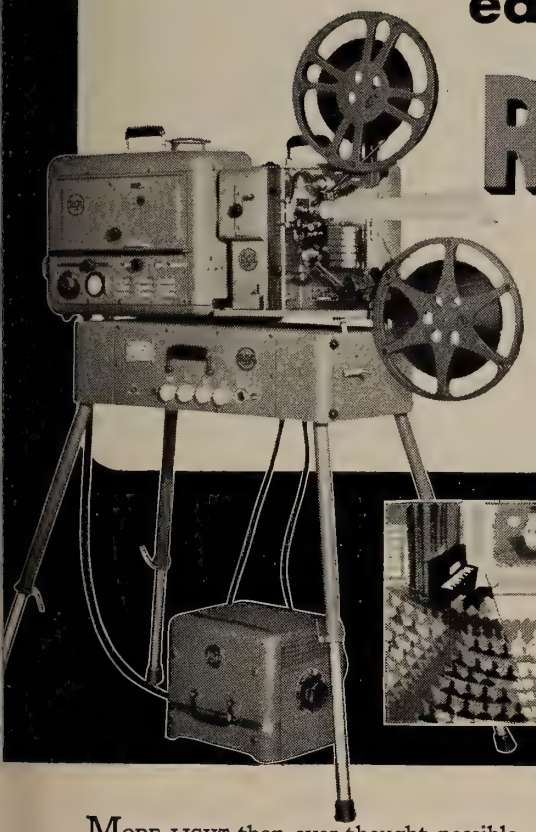
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American Cancer Society

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MONTHLY CHAT

PROJECTIONISTS who remember the hand-crank, the milk bottle and projection room batteries of the old shooting gallery days may feel that they're playing at being Buck Rogers in this age of wondrous confusion. Mule team drivers must have felt that way when they saw the first locomotive belching its way across the salt flats. Lee DeForest, away back in 1907, must have wondered a little when, for the first time in the life of any man, he heard the human voice via the vacuum tube.

Now, in 1954, IP ponders the problem of "What hath Sarnoff wrought?" — or rather, Gen. Sarnoff's bright young engineers!

It is curious that every advance in applied science, including the modern miracle of the motion picture, had its genesis in the work of some pure scientist struggling to find out about nature and not caring a hoot to what useful purpose his discoveries might be put.

Sound motion pictures would be impossible if Clerk Maxwell in 1864 hadn't worked out his theory of electro-magnetic waves. Or if Sir. J. J. Thomson hadn't isolated the electron in 1897, paving the way for the cathode, the rectifier, the Tv kinescope and ten thousand other items.

IP, in a Nostradamic mood, is wondering (backed by engineering friends in the electronics field) about the newest RCA demonstration, a tube powered by Beta rays from atomic waste. Next month we'll carry an article on this new development and on its application in the projection room. Meanwhile, let's do a little preliminary wondering.

The RCA gimmick is a simple tube, with a radioactive electron source bombarding a transistor-like wafer acting as the cathode. The radioactive material takes the place of the heater in the tube familiar to every projectionist.

Imagine the perhaps not too distant future when no heating elements will be necessary in rectifier tubes! Think of the simplified circuitry! Ponder the ease and fidelity of sound reproduction and amplification when the power source becomes an absolute constant!

Strontium-90, the radioactive source material, is abundant and, as a waste product of America's expanding atomic program, its cheapness makes for its speedy utilization in industry, including the film business.

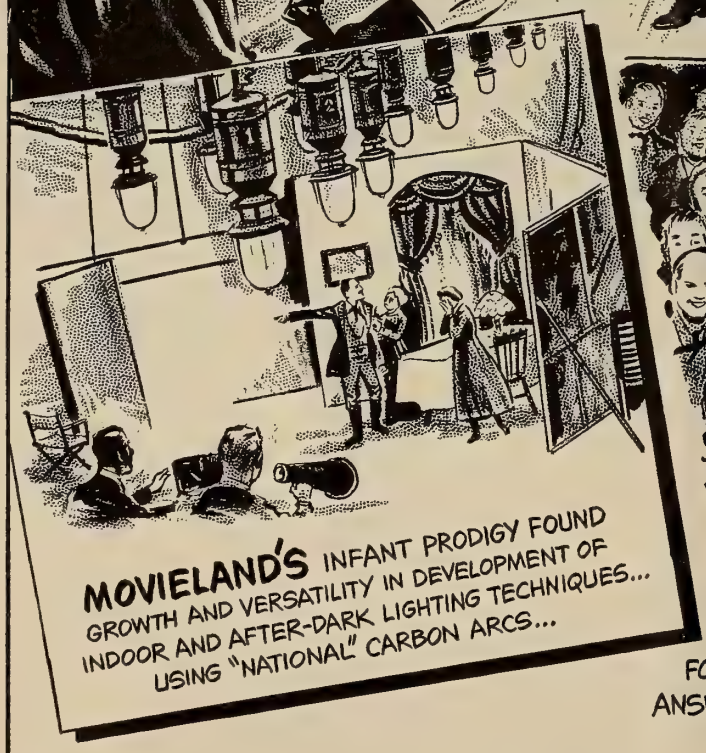
Less than a year ago few projectionists had ever seen magnetic sound tracks on film. Maybe next year, or the next, we'll be running our projection rooms with atomic power. Let's call up Mars and ask the engineers there about it. Or maybe we can call 20th Century Fox?

SEEING IS BELIEVING!



FAMOUS "FIRSTS"...

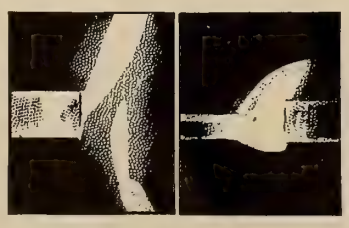
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This is the first of three articles

THE LENS: Key to Projection Quality

By ROBERT A. MITCHELL

A projection lens has no moving parts. It gets dirty and has to be cleaned at intervals; but there is nothing in it to wear out. When the focus is properly adjusted, the lens has nothing to do but "stay put" and "look" at the intensely illuminated photographs in the film-aperture. What the lens "sees" it paints with rays of light upon the large, distant screen.

Human vision is seldom perfect. Our eyes may be astigmatic, near-sighted, far-sighted, or have other things wrong with them which falsify our visual impressions of the world. And so it is with projection lenses. They too may suffer from various "visual" defects — spherical aberration, coma, astigmatism, field curvature, and other distortions. They may be unable to see the film-photographs as they really are, and accordingly mess up our screens with blurry, distorted images. But when the lenses function properly, the visual product captured on the film will be faithfully reproduced, its shortcomings as well as its merits.

Lens Is Everything

The projectionist understandably has a profound and tender respect for a pair of good lenses. He knows, as everyone else in the movie industry ought to know, that everything in a motion-picture production except the sound must pass through the lens of the projector. Many theatre-owners, profit-wise, are also aware of the importance of the projection lens; and they sagely seek the advice of the projectionist when considering the purchase of the new ones. Many theatre-owners, yes! But not all!

Penny-Wise Exhibitors

It might seem that no exhibitor would be so stupid as to consult an usher, a doorman, or a janitor about lenses. And yet that is exactly what some few exhibitors do. They allow themselves to be "educated" in projection technology by managers whose knowledge of motion pictures has been acquired on non-technical levels. The fellow who counts the pennies frequently draws no distinction between saving a shilling on lavatory disinfectant and practicing a similar "economy" on projection lenses. Ignorance has closed, not hundreds, but thousands of theatres.

A closed-until-further-notice sign on the door of a dark theatre may in about three out of ten cases be attributed directly to the type of exhibitor who expects the projectionist to "get by" with lenses that are chipped, cracked, heat-blistered, or just plain no good. Such an exhibitor blames his loss on Tv, high taxes, a mythical business recession, or almost anything except the real cause of his financial woes — the intolerably poor quality of his audiovisual wares. The moviegoing public can be lured into the "cheap" type of theatre only by unusually good films, a commodity too scarce to sustain the "dumps" through days and weeks of quite mediocre film-fare.

We do not want any theatre to close, but it does not surprise us when mismanaged theatres lock up for good. We dislike the idea of jobs being lost through the sins of managerial incompetents who do not belong in any theatre and would quickly ruin any business. It does not please us at all to see the public getting gypped by the "economists" who operate on a day-by-day basis and totally ignore projection, the one factor that often spells the difference between success and failure in the exhibition field. Only in projection are images dealt with, and it is only for the sake of images that cinema tickets are purchased. And the public today will pay to see only good images.

A Good Screen Image

The projectionist knows what constitutes a good screen image. He is the only employee in the theatre who knows on what factors a good screen image depends. He is not expected to possess the optical and mathematical knowledge of an optical scientist, nor is it necessary that he be capable of

designing a lens. He does not make projection lenses: he *uses* them! And he is the only person who uses them. And because of this, he knows that the performance of any lens depends in a great measure on the peculiar behavior of the intensely lighted and heated film in the projector aperture. His work thus involves certain practical aspects of lens-performance that cannot possibly enter into calculations of the optical designer.

The Basic Problem

The lens-designer, for example, goes on the assumption that the film-photograph in the aperture is a fixed, flat plane which, when the lens is in focus, coincides with one of the two conjugate focal planes of the lens (the other being the screen). The projectionist, however, is forced to deal with a film-photograph that flutters and practically never lies perfectly flat in the aperture.

The moment the rotating shutter opens to permit the light of the arc to strike the film, the center of the tiny film-frame begins to move along the optical axis either away from or toward the lens, eventually assuming the form of a pincushion. To get the best possible focus the lens must be moved to accommodate the pincushion-shaped photograph, but if the film flutters excessively even the best focus obtainable will not be very good and the screen image will be fuzzy.

Variation In Lenses

Projectionists who have operated in a large number of theatres and compared different types of lenses have found from actual experience that all makes do not give identical results.

Some give pictures of high contrast, but slightly blurry toward the edges of the picture. Other makes provide flatter fields, but with less sparkling contrasts. A third type may produce an extremely sharp image, but with a tendency to go out of focus easily; and a fourth type may give a softer focus that seldom requires refocusing for the focus-drift of the film. It will also have been noticed that coated lenses give much better images than uncoated ones, and that "fast" (F/1.8 and F/1.9) and short focus lenses (E.F. 1-½ to 3¾ inches) are sometimes rather troublesome.

The difference between a first-class lens and a poor one can be seen immediately, but the difference in the performance between two high-grade lenses of different makes is rather subtle. Differences do exist; and the projectionist is often correct when he maintains than one brand is better than another in the short focal lengths, while, perhaps, a third brand is superior in the longer focal lengths.

"Formulas" Vary

These differences are due to slight variations in the "formulas" used by different manufacturers for the same general type of lens, differences in optical glass, and differences in manufacturing methods. As a rule these variations are minor among American lenses, but rather pronounced among European brands. Some American lenses made before the war are not held in very high esteem, the English Ross and German Zeiss lenses of that era being preferred where quality projection really counts. Even though these foreign lenses are preferred even today by some exhibitors and projectionists, it is a fact that American optical manufacturers have produced projection lenses fully equal to the best European lenses.

The day of uncoated lenses is over; and there is no excuse for continuing to use them. Coated lenses provide images of increased brightness, clarity, and contrast. It is truly surprising what a difference the microscopically thin film of magnesium fluoride on the surfaces of the glass makes! It is too bad that good uncoated lenses must be discarded; but keeping them in service compromises picture-quality. Very few exhibitors can really afford to do that! Unfortunately, old uncoated lenses cannot be coated because the slight corrosion of the glass surfaces prevents an even distribution of the antireflection film.

"Short" and "Fast" Lenses

The greatest differences in the performances of lenses are undoubtedly due to differences in focal length, the shorter the E.F. (equivalent focal length'), the greater the focusing difficulties caused by optical aberrations and by flutter and buckling of the film in the aperture. Then too, the faster (larger) the short-focus lens, the more trouble it gives the projectionist.

A few theatres must use short-focus lenses because of purely local conditions. The projection room may be located at the edge of a deep balcony, for example, and be so close to the screen that short-focus lenses are necessary for a picture of adequate size. But a larger number of other theatres needlessly employ short-focus lenses. A picture which is too small is a bad thing; but a picture which is far too big is much worse!

Neglecting CinemaScope and other wide-screen processes for the present, it may be said that the width of the picture should be about 1/5 of the projection throw. This size of picture is obtained with 4-inch lenses. It is quite all right to use 4-¼-inch lenses for a picture just a few inches smaller, though to use 3-¾-inch lenses to get a slightly larger picture is inviting trouble.

Screen Size Importance

The size of screen suitable for a specific auditorium should be very carefully chosen in order to avoid a picture which is too large or too small. Actually, most theatres have screens which are a trifle too small. Unless the theatre is a long, narrow one, it is a safe bet that the picture is too small if lenses of longer focus than 4-½ inches are used. The best time to enlarge the picture is when the purchase of new lenses is contemplated. A new screen will probably be desired anyway. Order a screen 2 feet wider and higher than the new, larger picture, and there will be plenty of leeway if a slight error has been made in measuring the projection throw (distance from aperture to screen).

If the new picture is vastly oversized, however, extremely powerful lamps and very short-focus lenses are required. This combination is death to top-notch projection. Short-focus lenses show up even the smallest traces of film-flutter as a blur, and high-powered lamps under such circumstances, only increase the flutter. It should also be remembered that lenses of very short E.F., especially if fast, do not give such sharp images as lenses of normal focal length. In addition, oversized screens require magnification of the film-photographs to the point where they appear grainy and fuzzy to patrons seated in front seats.

Not only are the film-frames buckled into the shape of pincushions by the heat of the arc, but the film may also be twisted or warped at the aperture by worn film-runners or "pinched" by improperly adjusted guide-rails or

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That Hardy Perennial: Damaged Film!

CinemaScope and 3-D have aggravated an age-old controversy—the projectionist versus the exchange. Who's to blame when a show goes berserk because film breaks? Or when other damage, perhaps unavoidable, sends tempers soaring?

By JAMES MORRIS

PROJECTIONISTS are often irritated by what they feel is a lack of cooperation on the part of the film exchanges. One recent letter received by IP from a projectionist on the West Coast concerned an argument with an exchange there over a new print with nicked sprocket holes which the exchange insisted had been mutilated by improper threading of the projector. The projectionist, equally vehement, was sure that the exchange was wrong. Who's to blame? IP, in the projectionist's corner, thought it was about time we had another look at the problem of film damage.

Another letter from a projectionist concerned the large number of puzzling and messy cue marks on old prints coming his way from the exchanges.

When 3-D pictures were making their first appearance at both exchanges and theatres, the fur flew thick and fast, with both sides accusing each other of perfidy, neglect — or worse. However, in the case of 3-D both sides had somewhat valid alibis. Manpower on the exchange side was short, woefully short. And on the theatre side, few and far between are exhibitors who are willing to spend the money for proper inspection of the twin 3-D films by their projection staffs *before* the film is run for the first time.

Inspection Inadequate

IP has constantly, both in the "Monthly Chat" column and in other editorial columns, brought out the often inadequate practices of the exchanges. In fairness, we'll give the exchange people a chance at bat in this article.

An interesting insight into thinking at the exchanges can be gained from the remarks of one inspection room chief to IP. He wanted to cooperate with the projectionist and insisted that nothing could be gained by hurling accusations back and forth.

"What the projectionist should do," he said, "is check his print before he runs it and, if it is a bad print and if the time element allows, send it right back to the exchange and demand a new one. There's no point in running a bad print and then cursing the exchange when a break or other damage occurs.

"If the projectionist did this, he would be accomplishing two things. First, he would be clearly establishing that the damage did not occur in his theatre. Second, and even more important because it could lead to better service in the future, the projectionist's efforts might help in forcing the big bosses to hire more inspection personnel."

Too Many Layoffs

While talking, this man pointed to the inspection room at his exchange. Only half the tables were in operation. A number of inspectors had been laid off in recent months with poor business used as an excuse. However, even when business was good and the exchange was running full blast, the inspectors were in no position to properly examine all prints.

In many cases prints coming into an exchange today are merely labeled "checked" and shipped to the next theatre. When a print is actually inspected, an hour is the time often allotted for the complete inspection and repair of a feature film in fairly good condition. Properly and thoroughly done, this job could easily take three hours, it was estimated.

One cause of confusion among exchange personnel over the cause of print damage is the fact that they do not have the intimate knowledge of the motion picture projector that would enable them to understand that the most careful and alert projectionist will have plenty of trouble if it is necessary for him to work with poorly inspected prints and worn equipment that includes components such as sharp, hooked sprocket teeth.

According to exchanges, the most common types of film damage are: (1) vertical scratches or lines on the film; (2) bad splices or splices out of alignment; (3) "runoffs," or holes made by sprocket teeth in the picture area; (4) nicks and breaks in the sprocket hole area, and occasionally, (5) messy cue marks such as holes or slashes at the end of a reel.

Vertical Scratches

Vertical scratches, or lines running up and down the film on both the emulsion and support side, were regarded as the most common type of damage that film receives in the pro-



"Runoff," as illustrated above, is a common type of film damage that occurs when the film jumps a sprocket because of a stiff splice or some other reason. Long lengths of film are often damaged when the sharpened sprocket teeth cut holes in the soundtrack and picture.

jection room. The most frequent cause of this damage is in the valve rollers of the magazines, particularly the upper magazine, which is the first point of contact between projector and film after it leaves the feed roll. Dirt, oil and small pieces of film can accumulate at this point so as to prevent the free turning of the rollers, even preventing one or more from turning at all.

Another frequently-found type of film damage is nicked or broken sprocket holes. This was the kind of damage mentioned in the letter referred to in the first paragraph of this article. Such nicks usually indicate too much tension. The rub, of course, is what caused the tension? New prints in which the emulsion is not fully set, when exposed to the heat of the gate, very often become sticky and create tension which, in turn, causes the nicks as the film goes past the intermittent sprocket. Once the print has been seasoned a little, this trouble is eliminated.

Excessive tension at the film trap causes wear on both the projector movement and film. The sprocket teeth of the intermittent are more quickly worn out of shape. Tests by Eastman Kodak indicate that complete, equalized trap tension in excess of 16 ounces is unnecessary and only increases wear on film. Settings as low as six ounces, in some cases, seem to give a steady screen image.

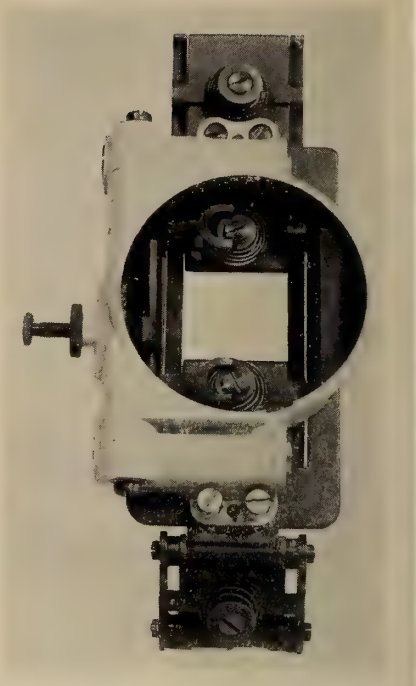
Another cause of nicked sprocket holes, and also of completely broken film, is faulty threading of the projector which results in the loop being lost at one of the sprockets while framing.

When the excessive tension at the film trap is the basic cause of nicks in the sprocket-hole area, the damage is actually caused by the teeth of the intermittent sprocket which can be worn into a hook-like shape or develop other malformations as a result of excessive tension when the film is pulled down. A tooth of this type will tear small pieces of film from the pulldown edges of the perforation.

Knife-like edges on the teeth of the intermittent sprocket is another type of tooth deformation that results from contact with the inside walls of the intermittent guide or shoe. Such teeth make small straight cuts parallel to the edge of the film on the pulldown edges of the perforation and well in from the corners. These small cuts can quickly lead to the breaking-off of the edge of the film.

"Runoffs," which are, of course, the gashing of the track and picture area, occur when film jumps a sprocket because of a stiff splice or some similar reason. It can also result from faulty threading. In addition to defacing the picture, these repeated gashes weaken the film in such a way that subsequent bending of the edges will often break it.

In order to minimize the danger of runoffs, it is advisable to check regularly the clearance between rollers and sprockets to see that rollers are holding the film properly in place but without pressure.



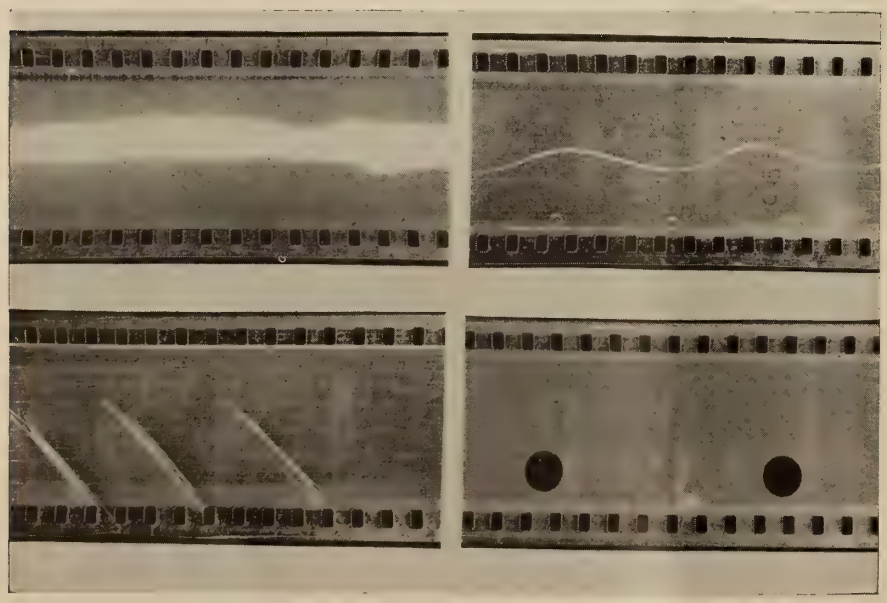
Tension adjustment on the newer projectors has been greatly simplified by the cone-shaped tension springs as illustrated above. Excessive tension from the film trap can cause much wear on the projector and prints.

Prints are often encountered where the film is bent between the perforation and one edge. Known as "idler cramping," this type of damage can be especially harmful with brittle film and when the bend is against the emulsion side. Long edges can be broken off completely. Usually starting at an edge break or loosened corner of a splice, this trouble most often occurs on the first pad roller of the intermittent loop.

Bad splices — splices where a proper joint is not made and splices that are out of alignment — are a principle cause of "beefs" from exchanges as well as from projection rooms because they lead to extra work or else to torn, broken or gashed film. "I want to know what kind of splicer some projectionists use," one inspector asked. "Do they have a bench splicer like the Griswold or do they splice by hand?"

In answer to this remark it can be said that not every splice on present-day film is going to be perfect or hold indefinitely. Exchanges which inspect prints hurriedly or don't inspect them at all, or even, as in some areas, go so far as to "bicycle" them directly from theatre to theatre, have themselves to blame when bad splices cause serious

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Four samples of unsightly changeover cue marks sometimes found at the end of reels are shown above. This type of damage is not nearly as common as it was some years ago and is generally found on old prints that have seen a great deal of use in many theatres over a long period.

Lamps that are SCREEN ENGINEERED

Lamps are selected on the basis of the prevailing or desired screen size.

While lamps such as the Super "135" work admirably on any size screen, they are unnecessary with small-size screens. Similarly, the Utility 1 KW lamp puts a "cheaper" light on a giant-size screen, but the results are unsatisfactory.

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25 feet	46-Ampere	Mighty 90	Mighty 90	1 KW	
30 feet	Mogul	Mighty 90	Super 135	46-Ampere	
35 feet	Mighty 90	Super 135	Super 135	Mogul	Mogul
40 feet	Super 135	Super 135		Mighty 90	Mogul
45 feet	Super 135			Mighty 90	Mighty 90
50 feet				Mighty 90	Mighty 90
55 feet				Super 135	Mighty 90
60 feet				Super 135	Super 135
65 feet				Super 135	Super 135
70 feet					Super 135

DRIVE-IN THEATRES

30 feet	46-Ampere	46-Ampere	Mogul		
35 feet	46-Ampere	Mogul	Mighty 90		
40 feet	Mogul	Mogul	Mighty 90	Mogul	
45 feet	Mogul	Mighty 90	Super 135	Mogul	
50 feet	Mighty 90	Mighty 90	Super 135	Mogul	
55 feet	Mighty 90	Super 135	Super 135	Mighty 90	
60 feet	Super 135	Super 135		Mighty 90	Mogul
65 feet	Super 135	Super 135		Mighty 90	Mogul
70 feet	Super 135			Super 135	Mighty 90
75 feet	Super 135			Super 135	Mighty 90
80 feet				Super 135	Mighty 90
90 feet				Super 135	Mighty 90
100 feet					Super 135
110 feet					Super 135
120 feet					Super 135
130 feet					Super 135

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Proper Tools a 3-D 'Must'

Third dimension pictures triple projectionists' problems, says Stanley Cohen, Polaroid expert who has some hints for better 3-D presentations

By STANLEY COHEN*

THE BEST CRAFTSMAN in the world can't do a top job unless he has the proper tools and good materials with which to work. Projectionists who have struggled with the third dimension and, in spite of their best possible efforts, have listened to frantic calls from "downstairs" that people were demanding their money back, will know the truth of that statement.

This writer has covered thousands of miles and visited projection rooms in dozens of cities, all in the interest of good 3-D presentation, a subject about which my company, the Polaroid Corp., is not exactly unconcerned. We're in the 3-D business up to our ears — and it's good business for us to have the best possible presentation of pictures in the medium. Hence this report to the craft on my own observations.

To begin with, 3-D with the twin films does not double the things a projectionist must check during presentation. It triples them!

Rebirth of 3-D

Polaroid Corp. is going all the way to give 3-D a technical shot in the arm. The object, of course, is to obtain perfect projection (such projection is now commonplace) of stereoscopic motion pictures. To that end the company several months ago started an extensive institutional program. Known as a "technical service program," it was first tested in the Boston and New York areas and then extended to other parts of the country. The goal is to reach, in one way or another, each of the 5,000-odd projection rooms in the country where facilities for 3-D presentations now exist.

After a few months of intensive field work, together with research, development, manufacture, distribution and training, we feel that our efforts have been rewarded. 3-D presentation today is immeasurably better than it was during the early stages of 3-D when projectionists literally had the twin reels thrown at them. They had to teach themselves, adjust to the new medium and put on a show without the proper tools,



Neils Hoiness, Local 306, checks his screen with a stroboscope at Loew's State, New York.

often with banged up prints that would have baffled the genius of a Houdini. Projectionists took the situation in stride without encouragement, without sympathy and, quite often, without explanations. Under these circumstances they have done a surprisingly good job. We at Polaroid like to think that our 3-D projection kit has made life a little easier.

The 3-D Sync Kit

Briefly, the kit includes high quality filters for mounting at the ports, a stroboscopic sync monitor and a sync control. The latter is wired between the selsyns of the two projectors and has a knob which permits relative adjustments in 1/6 frame steps. Used together, the monitor and the control enable the projectionist to discern and correct variations down to 1/12 frame. To detect variations greater than one frame, a window with a tell-tale filter is mounted on top of the monitor unit. This filter, which presents the two images of the right and left projectors as overlapping images of red and green respectively, permits the projectionist to determine which projector is running visibly ahead of the other by seeing which color is leading the other in fast-action scenes. Use of the sync control easily brings the two film strips to within one frame of each other. Mis-synchronization is then further corrected by lining up the strobe stripes.

Projectionists visited on our field trips were cooperative, enthusiastic men who were trying to put on a good show with new and complicated tools and often under the most adverse conditions. Let's look at some of the problems this writer met in projection rooms up and down the country:

Tell-Tale Filter

Suppose your picture gets out of sync, you look into the window of the monitor and observe that the stripes line up. You look at the screen and see slightly watery images. Now you try the tell-tale filter atop the stroboscope and discover that the two images, red and green, are not moving simultaneously but are so close you cannot tell which is leading. You know two things for sure: first, because the strobe stripes line up, you know that the error is in whole frames, and, second, the error is probably one or two frames, no more. To correct, you turn the switch one complete turn, that is six snaps, in one direction. If the sync looks perfect in the tell-tale and with your 3-D glasses on, you have corrected a one-frame error. If it looks better, but not perfect, you continue in the same direction one more full turn of six snaps. Now sync should be perfect.

If turning the control in one direction makes sync look worse in the tell-tale, you simply go back to where you started and then make one complete turn in the other direction. When you become familiar with the equipment, and can recognize a one-frame error, correcting it becomes routine. The whole procedure can be carried through in a matter of perhaps 30 seconds.

A one-frame error may be due to a number of things: improper syncing of the film at the exchange or in the projection room; improper threading, or framing to correct vertical displacement on the screen. Actually, all

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of these can be avoided. It is common practice in many projection rooms for two men to switch machines before starting in order to check each other on start marks, loops, flywheel sync marks, etc. Every 3-D film should be tried on a dry run before the opening day and, of course, the same applies if replacement prints come from the exchange. If prints are out of sync, the time to find out and to correct errors is before the first ticket is sold at the boxoffice.

The Kit in Action

An example of the 3-D sync kit in action was seen by one of Polaroid's men in a projection room in Connecticut. There was a film break and, in splicing, one foot of film had been left out of one of the mates, an error that could, and does, happen very easily. When the picture hit the screen the sync was out by 16 frames. Sixteen full turns of the control, six snaps to the turn, and the picture was perfect again in less than two minutes.

This writer was present in the projection room at an important preview in Chicago when the intermittent sprocket sheared its retaining clip on one of the projectors. Fortunately, the circuit technician was handy and he repaired the machine in five minutes. Just six minutes after breakdown the picture was brought back into sync.

In New York, at a key opening, a vertical frame error occurred when the second pair of machines was turned on. The right projector was framed down quickly. But framing the picture had produced a one frame sync error which was corrected in 25 seconds.

The above instances are given to show how simply matters can be handled when things go wrong, provided the projectionist has the right tools and provided he has the know-how.

Some projectionists have expressed concern over a slight jog in the stripes of the strobe monitor, that is, black lines are over black lines and grey lines are over grey lines but they do not line up perfectly. This is due to backlash (electrical wind-up), or to gear slippage in the system, and is nothing to worry about. The error is perhaps 1/12 of a frame and is as close to perfect sync as is necessary. It is possible, too, that the shutters are not in exact alignment. This can be easily adjusted.

Bad sync is not the only problem in projection of 3-D. Focus, variable brightness, clean and level filters, image registration and proper carbon trim are other things to watch for. Focusing is simple with Polaroid focusing filters, and the projectionist should make a check after starting each reel. Field glasses, even inexpensive ones, are a great help in focusing and close reading of the screen. From the orchestra floor detecting bad focus is even simpler by alternately closing one eye and then the other while wearing 3-D glasses.

The two images should be as nearly equal in brightness as possible. The Polaroid brightness matching filter is helpful here. Carbons should be feeding properly and with the proper arc adjustment for equal burning. In some color prints the color values vary between the two images. This may cause an apparent difference in brightness which may alternate with scene changes. Correcting the lamps for one scene may cause the next scene to go off. This is another good reason for a dry run before opening with new prints.

Filters and Targets

Projection filters should be checked for power of blackout. When the polarizing axes of the filters are crossed at right angles, transmission should be nil except for a dim violet light that may get through. Polaroid No. 750 filters are specially designed and manufactured for perfect 3-D projection because we know from sad experience that filters of poor optical quality can play havoc with projection. You can check optical quality by such tests, for example, as holding the filter at arms length and sighting an object through it with one eye. If the object seems to "worm" or jiggle when the filter is moved slowly up and down, the filter is faulty.

Projection filters should be horizontally level and in this a spirit level is a mighty useful tool to have around. If the projection angle to the screen is greater than 20 degrees, it is a good plan to bring in the bottom of the filter in order to have the filter perpendicular to the beam as closely as possible. Most important of all, however, is to have clean filters. It is wise to check them before each 3-D engagement and change them when scratched or oily.

Perhaps the problem getting the least attention in 3-D is image alignment. The cameramen taking stereo movies give the two images the proper horizontal displacement (interocular) by adjusting the camera lenses. The films are then printed carefully so that this interocular displacement is retained. Therefore it is essential that the two projector beams be exactly superimposed on the screen. This can be done only by using lenses of matched focal length and by running target films. There must be no vertical nor horizontal displacement of the target patterns.

Some target films are not symmetrical. That is, the pattern may be closer to one edge of the film than the other. Therefore it is necessary to thread both target loops with the patterns on the same edge.

If the picture has a vertical displacement the patrons' eyes try to twist, one up and the other down. If the horizontal displacement be too great, or too little, the 3-D depth effect may be altered or lost entirely. A vertical error may be corrected by framing one or both projectors, but always check the sync after correcting a framing error. Framing may cause one picture to advance by one or two frames and this becomes a sync error.

One-Eyed 3-D

On occasion a carbon may burn out while showing a 3-D film. When that happens people are watching a flat movie with only one eye. The other eye is blacked out. This, of course, is a very disturbing situation giving rise to headache. If a carbon burns out, the first thing to do is to remove the filter from the port where the picture is still going. This will allow the theatre patrons to see 2-D with both eyes until the burned carbon has been replaced. Then douse the "dead" projector. When the carbon has been replaced, put the filter back in the port where the picture is on and then fire the other machine.

It seems that there are many things to do in order to give a good 3-D show. These things, however, become routine once the tricks are learned.

Before writing "finis" to this little exposition, this writer, on his own behalf and on behalf of Polaroid, would like to thank the projectionists, the technicians and the service company field engineers, and all others who have given us such whole-hearted cooperation in making 3-D an attraction calculated to bring more people than ever into the theatre.

Atom-Smasher Principle Aids Color TV

Projectionists very much in the picture as color TV gets off to a hesitant start with the Cyclotron idea of electron acceleration spurring new controversies

By FREDERICK HODGSON

PROJECTIONISTS who have watched technological advances turn the motion picture industry topsy-turvy within the past twelve months may spend a profitable and enlightening moment considering the effect of progress in other fields, color television as the top example. If any there be who think that Tv in rainbow hues has nothing to do with the film business, let them read this month's "Spotlight" in IP and ponder some of the data recounted there.

This brings us back to the subject under discussion in this series of articles, color television at the receiving end — the cathode tubes, or kinescopes, that bring the show into the living room and will eventually bring Tv into the theatre. Either way, the projectionist is very much in the picture.

Last month we discussed very briefly the three kinescopes so far entered in the color television sweepstakes, the three-gun RCA and CBS tubes and the simpler one-gun Chromatron developed by Paramount-owned Chromatic Laboratories.

Atom-Smasher Principle

The Chromatron, devised by Dr. Ernest O. Lawrence, inventor of the atom-smashing Cyclotron, makes use of the Cyclotron principle of high acceleration voltage to fire the picture-carrying electrons from the cathode at ultra high speeds into the phosphor strips of the face, or picture, plate of of tube. Let's pick up where last month's article left off and examine a few of the differences between the three top kinescopes so far announced.

Some Chromotron Details

The basic differences between the Chromatron and the CBS-Hytron and the RCA tube have been recounted previously. It remains now to cover details of the Chromatron, some of them shared with the other kinescopes.

The Chromatron uses a flat viewing plate with more than 1,000 phosphor strips placed horizontally across the back for the 21-inch picture size. The color scheme used is red, green, blue, green, red, green, and so on, every second strip being green. Other combinations might be used for the strips, provided every other strip were of the same color phosphor. Back of each red and blue strip (none for the green) is a fine wire carrying the voltage which switches the electron beam to the proper color.

There has been some criticism of the Lawrence tube on the score that the voltages necessary for its operation are too high. In truth, the Chromatron anode voltage is 18,000, which is the same or less than, with either the RCA or the CBS tubes. Voltages must correspond for the high velocity electron beam and for the control grid wires.

Too, it has been asserted that there is a loss of electrons caused by the grid wires and that this results in a loss of picture brilliance. IP fails to see how this loss of 15% or less in electrons can be a greater disadvantage than is the obviously much greater loss of electrons caused by the perforated metal masks of the RCA and CBS tubes. Some electronic engineers place this loss as high as 85%, a figure vehemently denied by RCA spokesmen.



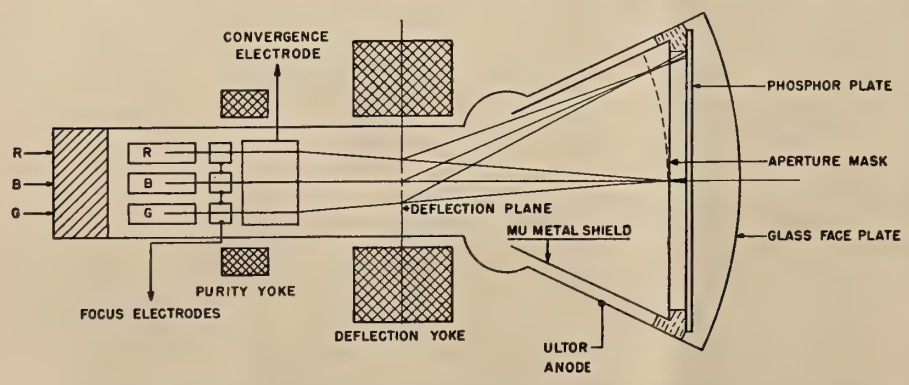
This is an early experimental Chromatron, or Lawrence tube. Production models for 21" and 24" color pictures will be rectangular at the face plate instead of round. Note the short distance between the cathode in the neck of the tube and the phosphor face plate.

Aperture vs Grid

In the Lawrence tube the electron stream from the single gun is bent around the grid wires to hit the proper phosphor strip. In the aperture or perforated masking plate type of tube there is no bending effect, part of the electron stream being stopped dead by the metal plate. Only that part of the beam passing through the perforations is of any use in bringing the color picture to the screen. Even a casual study of the illustrations accompanying this article will make the point clear.

Stated as briefly as possible, and closely quoting Chromatic engineers, claims for the Lawrence Chromatron are:

1. Wide deflection angle. This is 72 degrees, making it a short tube. The overall length for a 22½-inch picture is 22 inches, comparing very favorably with the length (from the



Above is a simplified cross section of the present RCA three-cathode (or gun), tri-dot kinescope, or receiving tube. Note the length of the tube in contrast to the other tubes illustrated.

face plate to the back of the cathode in the neck of the tube) of your 21-inch black-and-white set at home.

2. Large picture. Over 60% larger than pictures produced by three-gun shadow mask tubes of the same dimensions.

3. Bright picture. At an anode voltage of 18,000, the brightness measured through 66% efficient filter face plate is above 50 foot lamberts in the highlights.

4. Low raster (image) scanning power. The deflected beam is one quarter the potential of the final acceleration.

5. Resolution. In the horizontal direction definition is equivalent to black-and-white. In the vertical it is limited only by the number of color strips.

6. Standard deflection components. The tube uses standard low-cost black-and-white magnetic deflection yoke and standard magnetic focal coils.

7. Quick set up. This is done in a matter of minutes since there are no problems of raster registry or dynamic convergence. This is in contrast to other tubes.

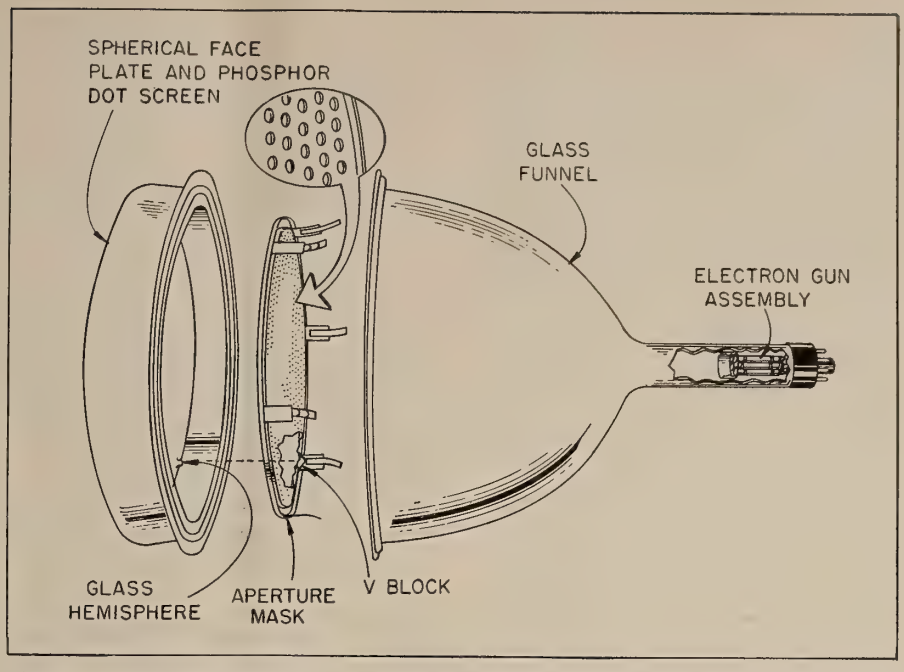
8. Simplified circuitry. This is because the Chromatron is a one-gun tube, not three.

Other Advantages Claimed

In addition to the above, Chromatics engineers boast of fringe-free color pictures and fringe-free reception of black-and-white. They claim that the tube is relatively inexpensive to produce because of several factors, notably because of the single gun, the standard magnetic yokes and the fact that only reasonable production tolerances are required. Alignment of the Chromatron is extremely simple.

The Lawrence tube illustrated with this article is an early experimental type, no pictures of the new tubes being available as IP goes to press. The new tubes are rectangular at the face, rather than round. It is pointed out by practically all concerned in the development of color television that the present production bottleneck is the shortage of envelopes, the glass bottle of the tube.

An indication of the expected demand for Chromatron tubes is found in Chromatic Laboratories' action last month in setting up new facilities for grid production at the company's plant in Emeryville, Calif. This new plant, scheduled to employ some 200 people at the start, will be in production by the end of March with an initial capacity of 25,000 grids per year. CTL has been making grids for licensees and potential licensees in a pilot plant connected with the company's Oakland laboratories.



Above is an "exploded" diagram of the CBS-Hytron tube showing the three-gun assembly inside the neck of the envelope. Note that the phosphor screen is on the face of the tube itself.

Start of mass production of the Lawrence tube and delivery to set manufacturers for enclosure in cabinets with the necessary electronic units for its operation should come quickly, according to Chromatic Laboratory's president, Richard Hodgson. At this writing two manufacturers, Crosley and Thomas Electronics, Inc., of Passaic, N. J., have been licensed to produce the tube. The Thomas firm, said to be the largest manufacturer of cathode tubes in the country, is picture tube supplier to most of the major producers of Tv sets.

Some further, and a bit more technical, information on the Lawrence tube might be of interest. An examination of the diagrams will show that the wires behind the red phosphor dots are electrically tied together and are brought to a single terminal at the side of the tube. In the same manner the wires behind the red phosphors are tied together and brought to a second terminal. There is a third electrode for the aluminized backing of the phosphor plate.

As stated previously, a focusing and acceleration potential is applied between the electrical center of the wire grid and the aluminum coating. This creates the electrostatic lens, or rather series of lenses, in the front section of the tube. As electrons stream down the length of the tube from the single cathode gun perpendicular to the image plate, they are focused sharply by this series of lenses to the green strips between each red and blue strip, when there is a zero potential between the red and blue termini of the wire grid. Thus a green raster appears on the image plate.

At this point, to quote Robert Dressler,* director of research and development at Chromatic's New York Laboratory, "a potential difference may be applied between the sets of wires to deflect the focused beam in the direction of the positive wires. This voltage can be made of such a magnitude that the beam will strike a phosphor strip adjacent to the green, thus rendering a red or blue raster on the image plate, depending on which set of wires was positive. Separate colors, therefore, can be displayed by simply changing the potential of these wires. With a color switching device of this type, the color displayed depends only on the potential of the wires, so that no color distortion or contamination can result from nonlinear sweeps or minor inaccuracies in gun position. In addition, the cylindrical lenses up front focus the beam of electrons into a spot so fine as compared with phosphor strip width, that the placement of wires

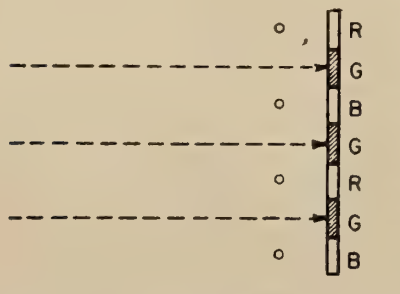
* In a paper read at the July, 1953, meeting of the Institute of Radio Engineers.

behind the phosphors need not be extremely critical."

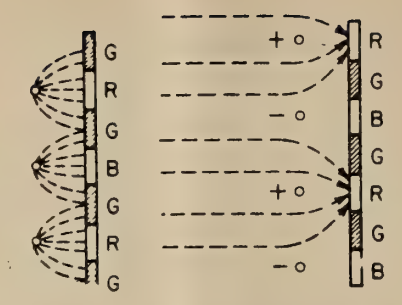
The CBS-Hytron tube, known as the Colortron, was unveiled to a waiting world last October and turned out to be a shadow mask, tri-dot three-gun tube. Thus it is similar to the RCA tube in some of its important aspects, but quite unlike the Chromatron. Its main point of distinction is a curved rather than a flat type mask designed to minimize or completely eliminate color convergence. This latter simply means color registration. Production differences are also announced for this tube, which is shown in "exploded" form in the diagram (Page 15), the main one being the method of applying the phosphor dots. This is accomplished for the Colortron by a photographic technique. In the case of both the RCA tubes and Lawrence tube, the Chromatron, application of the phosphors is by silk screen, although individual manufacturers of these tubes may elect to use other methods.

Too, the Lawrence tube has been criticized to the effect that the phosphor strips are visible to the viewer and do not give the smoothness of either the RCA or the CBS-Hytron. It is argued that the 1,000 or so phosphor lines, each 15 mils wide, cannot compete with the million phosphor dots. The reader can judge for himself by simply watching color television on the three tubes and contrasting the performance of each.

Feel this page of IP for thickness and you'll have an idea of the width of the phosphor strips. This page is approximately 2½ mils thick. Therefore, roughly, the phosphor strip of the Chromatron is six times as wide as the page thickness. Chromatic engineers are working on methods which they hope will reduce the strip width to 10 mils or even less. Ten mils, of course, is one one-hundredth of an inch.



The sketch shows how electrons from the cathode of the Lawrence tube, travelling thousands of miles per second, strike the green phosphors without hindrance from the grid.



Shown here is how the electron stream from the cathode of the Lawrence tube to the aluminized phosphor face plate is acted upon by an electrostatic "lens" (the grid) and is deflected at the grid (indicated by plus and minus signs) to the appropriate phosphor strips. Note that the polarity alternates.

Pilot production of the CBS-Hytron tube is set to start this month at the Hytron plant in Newburyport, Mass. At the Kalamazoo, Michigan, plant, production is scheduled to begin in September.

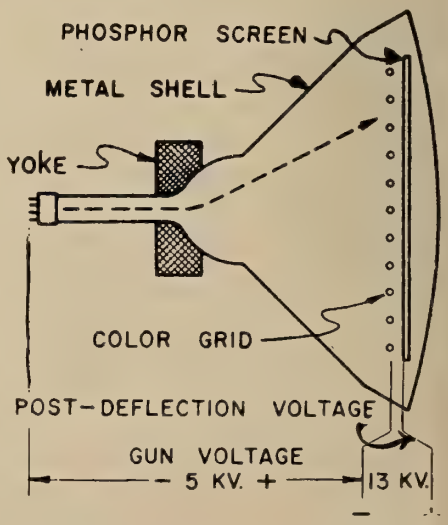
Bruce A. Coffin, president of the CBS-Hytron division of the Columbia Broadcasting System states that emphasis will be placed on production of 21-inch rectangular models. Hytron tubes seen by IP have been round, very likely due to the same bottleneck in the glass envelopes that is plaguing other manufacturers.

The Hytron tube has a metal face mask held from the flat glass phosphor plate by a spacer frame. This is to maintain a rigid relation between the perforations of the mask and the related phosphor dots which are planted directly on the inner face of the tube. This latter trick has the advantage of keeping down the weight of the tube. The tube, so CBS claims, does not require the high vacuum of the RCA tube, an important cost factor in manufacturing.

An interesting point of difference between RCA and CBS is the fact that the latter clings tenaciously to its field-sequential system in transmission. RCA uses a three-tube, or three orthicon, taking camera. Dichroic mirrors split the color image into its red, blue and green components, then reflects the beams through color-selective filters to the trio of orthicons, whence they are fed to the adder, then encoder and the transmitter. CBS, on the other hand, uses but one taking tube but splits the image into its component colors by means of a spinning color wheel. The alternating red, blue and green impulses are then carried to an ordinary black-and-white tube, a system of mirrors picking up the color and picture information from there and reflecting this information triad into three color tubes, one for red, one for green, and one for blue. Each of these tubes has a shutter synchronized with the color wheel (doubtless by selsyn interlocks). The information is then carried through the rest of the broadcast circuit and out onto the air as a compatible picture.

Incidentally, the field-sequential system, now passe with the adoption of the NTSC standards, simply fired the pictures at the receiving tube in a rapid succession of color messages. These could be separated at the receiving tube by means of a color wheel. Such a system was incompatible because color television could not have been picked up by the present black-and-white sets. Nor could color sets built for field sequential reception pick up the present black-and-white telecasts.

An interesting sidelight to the sudden furor over the advent of commercial color television is RCA's interest in projection color television. The reason is easy to figure out. The three-tube projection system of the RCA laboratories projects images through a special optical system onto an 18 by 24 inch translucent screen. For a picture of similar size on the RCA color tube described earlier in this article, the tube would have to be nearly three feet in diameter. This experimental projection of color television has been demonstrated by RCA on full-size theatre screens.



This is a cross section of the Lawrence, single-gun Chromatron tube. Note how the electron stream inside the shell is deflected by the coil magnetic yoke. Note, too, the placing of the wires of the color grid in relation to the phosphor face plate. The 13 KV post deflection voltage from the grid "lens" varies.

Light Gain, Better Screens Demanded by New Systems

So-called "all purpose" screen for CinemaScope 3-D and wide-angle projection is industry need

By LEONARD SATZ
Raytone Screen Corporation

THE SUDDEN importance of wide-screen, 3-D and anamorphic presentation in our industry has created a critical need for more efficient screens. The interpretation of "more efficient" will vary a good deal in the considered opinions of many experts and has, indeed, caused quite a stir.

One fact stands out above all others. More light is required from the projection room and higher brightness is a must as far as the reflectivity of the screen is concerned if acceptable standards of projection are to be maintained. (See table.) How much more light and how much higher gain, and the distribution of these qualities in any theatre, is a question that has been bandied about with too much apparent positiveness by some, and without due regard for actual results in the theatre auditorium.

3-D Needs Most Light

A so-called all-purpose screen is now in demand. The screen manufacturer must carefully consider the requirements — facility to show 2-D, 3-D, wide-screen and anamorphic systems. The least amount of light gain is required by the anamorphic system since its lenses transmit wide-angle lighting more efficiently, but this gain is somewhat tempered by the fact that two lenses are needed. A regular lens plus the attachment of a six-element anamorphic lens results in slower speeds and light losses because of reflection at extra lens elements. However, the system still transmits more light than any other wide-angle technique.

3-D on a wide-angle screen requires the most light. Here, according to unquestionable authority, brightness gains on the order of five times are required to overcome the deficiencies of polarizing porthole filters and audience viewers. A compromise is in order, and the writer believes in brightness gains of approximately three. In other words, the screen must be capable of reflecting 300 percent more than a white screen at peak performance. No screen can do this at all angles — here one must be practical.

Brightness curves or graphs are like electrical characteristic curves for the tuning of a sound system. With the latter, add high frequencies and it is the same as eliminating the lows. With the former, add brightness at the sides and the center will suffer. Add too much in the center and the sides will suffer. At this point the writer, believing in a practical approach, feels that a screen must return the maximum possible amount of light to the greatest number of desirable seats in any auditorium. It must also distribute light evenly enough to avoid "hot spots" and too rapid fall-off within useful viewing angles. The word "useful" should be analyzed with care in this instance.

A theatre traditionally fills up in the shape of a modified diamond. The most desirable seats are occupied first in the center diamond. Then overflow takes place at the rear, next at the center and rear sides, and lastly, the extreme front of the theatre, especially the front sides. The exhibitor is well qualified to judge the results and knows the useful angles that are his special problem.

It might be well to quote here from a report that was prepared by a technical and scientific organization within our industry, the Motion Picture Research Council, whose reputation for accuracy cannot be questioned:

"We can see that to bring brightness levels up to the values now obtained in accepted practice, it is necessary to increase the brightness of wide screens or of screens used for 3-D, either by increasing the total light reaching the screen from the projector or by increasing the brightness of the screen for a given illumination, or both.

Increasing Brightness

"As has been indicated, two general methods are available for increasing screen brightness. One is to increase the light from the source. The other way is to increase the *brightness gain* of the screen. This can be done by increasing the reflectivity of the surface or by changing the reflection characteristics so that more light is reflected in those directions where it will be useful."

Either of the above methods can be used with success, in the opinion of the writer. The question of uniformity of surface enters the picture and becomes the manufacturer's problem.

As for polarization defect, the Polaroid Corp. would like to see screens with a polarization defect of only 0.5 or one half of one percent. This is attained by certain screens at direct viewing angles, but varies considerably at 45-degree viewing angles. At this extreme, defects as low as 1 percent and as high as 6.5 percent have been noted. In the author's opinion, at wide viewing angles the defect should not exceed approximately 2 percent for best results. Since 3-D is still with us and promises to be an important feature for some time to come, the exhibitor should ponder well the over-all performance of any contemplated new screen.

BRIGHTNESS INCREASE REQUIRED TO MAINTAIN PRESENT STANDARDS*

Screen aspect Ratio	With Anamorphotic Lens		With reduced Aperture Height	
	2D	3D	2D	3D
1.33 to 1	1.	3.33	1.	3.33
1.66 to 1	1.25	4.17	1.56	5.20
1.75 to 1	1.31	4.36	1.72	5.75
1.85 to 1	1.39	4.63	1.92	6.40
2.00 to 1	1.49	4.97	2.27	7.55
2.66 to 1	2.00	6.67	..	..

Present Standards mean Screen Brightness at center of 9 to 14 Ft. Lamb.
Present Standards mean incident light at center of 12 to 19 Ft. Cand.

* Table prepared by the Motion Picture Research Council

What's Your Problem?

Projectionists whose problems appear below will each receive a $5.00 check from IP. We'd like to know "what's YOUR problem?"

Q. *Will you please help another "goat" — namely, a projectionist. I am supposed to be at fault over some damaged film. The exchange claims I damaged it by faulty threading of the projector. I believe the damage was due to defective perforation. I am enclosing a sample of the film. 1400 feet was damaged from the Paramount feature "Roman Holiday" which I ran as a new print. Being unable to convince the exchange, I am taking the privilege of asking your expert opinion and advice.* JACK BAYLOR, *Mt. Baker Theatre, Local 117, Bellingham, Washington.*

A. The damage on the film sample sent to us, tiny nicks in the pulldown edges of the sprocket holes on both sides of the film, could have happened in a variety of ways and in a variety of places, even in the processing laboratory itself. Sometimes these prints leave the lab and go in and out of the exchange and somehow miss inspection all along the line. However, you seem to be quite sure that the damage was not caused by faulty threading. This narrows things down to two possibilities, a faulty print from the lab and damage due to newness of the print and occurring in your projector. An "unseasoned" print when first exposed to the heat at the film gate can suffer a softened emulsion. This may work off at various spots in the projector mechanism and, being gummy, increase tension just enough to cause the nicks as shown on your film. This sticky emulsion may, after awhile, work its way out, or be worn off, and then we'll defy anybody to tell what caused the trouble. The projectionist can examine his loops while the machine is running, check his tension — and then wonder how in heck the nicks got on his film. The people in the exchange don't wonder at all, they just blame the projectionist. Incidentally, your letter gave IP the idea that it was about time we ran another piece on film damage. It's in this issue.

* * *

Q. *It seems to me that it is about time that something be done about "black prints." I mean those "tar paper" black-and-white prints you can't pump light through. Thirty years ago, 35 amps produced a well-lighted picture. Then prints came along that were darker and we boosted the amps. Then the prints got darker. The lamp manufacturers turned out better lamps. Again the prints got darker, and once more better lamps came along. National Carbon Co. came out with better carbons. So the prints got darker. Like Major Bowes once said, "Round and round it goes. And where it stops, nobody knows." To this writer, it seems that it is about time this thing were stopped. I would suggest that members of projectionists' groups, the producers, and the film labs get together and talk this thing over. The writer works in a drive-in. Picture is 58 feet wide; throw, 260 feet; angle, ten degrees up; picture area, 2525 square feet. Aluminum-painted screen does not help any. The drive-in operator is really behind the eightball. I believe the above situation is worth looking into.* H. Y. BALLOU, *Manhattan Beach, Calif., Local 150.*

A. With an outdoor screen as large as yours it is no wonder that prints seem to be made of tar paper. So far as conditions 35 years ago are concerned, the drive-in business was unknown. Theatre screens were smaller and not nearly so well lighted as they are today. Since that time organizations such as the SMPTE and the Motion Picture Research Council have established standards both for print density and screen light that are aimed at giving the sharpest and most pleasing picture possible in indoor theatres. Unfortunately, similar standards have not as yet been set for drive-ins.

It is true, of course, that a somewhat brighter picture can be obtained on a drive-in screen if a lighter-density print is used. We hear that it is a common practice to supply such prints in areas where there is a heavy proportion of drive-ins, and the print is known to be specifically for them. Light gained in this manner, however, is gained with a loss of sharpness and contrast. It is a question of which is the lesser of two evils.

CinemaScope in Britain

Only 13.5% of theatres in Great Britain could switch to CinemaScope and maintain that system's aspect ratio of 2.55 to 1 without structural alterations, according to a survey by the British Kinamatograph Society. It was pointed out, however, that 80% of the theatres could show CinemaScope if the height of the picture were reduced about 27% to preserve the width to height ratio.

Ampex Has New Stereophonic Sound Series

A new stereophonic theatre sound system designed to "make show failure almost impossible" has been developed by the Ampex Corp., Redwood City, Calif. The system, known as the Master Series, is priced at $3,995 for the complete package. Distribution is through the Circuit Construction Corp., and all installations are handled by the Altec Service Corp.

Some 100 Ampex sound installations are now in theatres throughout the country, according to Harrison Johnston, Ampex sales manager. These are in the 30, 60, 80 or 100 watt classifications. The new Master Series, in the 30 watt class, follows the higher priced De Luxe series and Super series.

Primarily a three-channel system, the Master series may be changed to four channels by using the theatre's existing optical system, it was stated by Ross Snyder, Ampex engineer.

The new 30 watt series equipment includes two penthouse magnetic reproducers, each equipped with four channels in the head, three for sound and one for the signal, together with a simple switching system adaptable for either three or four channel operation. Power amplifiers, pre-amplifiers and three stage speaker groups are included in the Ampex package.

The safety feature, Snyder said, is a switch in the projection room whereby the projectionists can correct any speaker failure quickly by funnelling the sound from any one channel into the two remaining speakers. Should two speakers fail, the one remaining speaker could handle the whole show.

Failure of any pre-amplifier or power amplifier will not cause a show stop, according to Ampex engineers, since the same type of emergency switch enables the projectionist to use the equipment remaining in operation.

Harrison Johnston said that 45 Ampex installations were made in the New York area for showing "The Robe" during the holiday season. Ampex equipment, Johnston said, was installed at the Egyptian Theatre in Hollywood for the world premiere of MGM's first CinemaScope picture, "Knights of the Round Table."

Pension Protection -- Goal of Labor

Various cost factors that must be worked out when setting up an adequate pension plan — now much discussed among IA men — are considered in the following article which reflects the official views of the AFL.

V

COST is probably the most difficult single question involved in the establishment of a pension plan. Only a reliable actuary is qualified to make a firm estimate as to how much a given level of benefits for a particular group of workers may cost—or how much in the way of benefits a given level of contributions can safely provide — and even his estimate is likely to be little more than an educated safe guess.

While the union negotiator should not undertake the functions of an actuary, he should know something about the principles upon which cost estimates are based, so as to be able to make intelligent use of these figures at the bargaining table, and in the administration of the plan.

The actual operating costs of a retirement plan will be determined by: (1) the amount of benefits paid to each retiring worker; (2) how many workers qualify for benefits; (3) how long retired workers live to receive benefits; (4) the rate of interest earned through the investment of the money held in the pension fund; (5) the expenses incurred in administering the pension system (clerical expenses, legal, actuarial and accountant's charges, etc.).

Actual Pension Cost

The real cost is equal to the total benefits paid out, less the interest earned, plus the operating expenses. How much a plan will be costing at any one future *moment* in time cannot be accurately predicted long in advance. However, over an extended period of time, the temporary up and down movements of these variable factors will tend to balance out.

To aid in making this estimate, the actuary has certain facts, records, and tables of statistics available. These records and tables show what past experience with the factors affecting pension costs has been.

If a group of workers is large enough to enable the "law of averages" to work out as expected; if the group has no peculiar characteristics which might cause a variation from the general experience on which the assumptions were based; then the actual cost should — over the long run — turn out to be reasonably close to the actuary's preliminary estimate.

There are other causes which may lead to substantial deviations between estimated costs and actual costs. A system whereby cost estimates are based on certain past averages cannot anticipate long-term upward or downward trends which may cause these averages to be no longer valid in the future. There is no practical way for instance in which actuaries can take accurate account, in advance, of extraordinary events such as wars and depressions.

Generally speaking there are two ways in which unions and employers can get outside actuarial assistance in setting up a pension plan. They can either engage a professional consultant on a fee basis or they can call in an insurance company representative and ask him to submit cost estimates for a proposed plan.

An insurance company will supply cost estimates "free" of any direct charge to the union or employer, in hopes of selling its particular insurance product to the parties. However, all of the insurance company's expenses, including sales commissions, and profits, are included in its premium charges — so none of its services are actually "free" of charge.

(Continued on page 33)

Versatile Magnarc Lamp Used for CinemaScope

The versatile Peerless Magnarc reflector arc lamp, standard equipment in a variety of projection rooms since it was first marketed in the thirties, has been adopted for many CinemaScope and 3-D installations during the past few months according to the manufacturer, the J. E. McAuley Mfg. Co., Chicago.

The Magnarc, which can be operated on a wide range of current loads from the so-called one-kilowatt trim using 40 amperes with 7-mm positive and 6-mm negative carbons to a 75-ampere trim using 9-mm positive and 8-mm negative carbons, is easily adjusted to meet different light requirements. If, after installation, it is found desirable to change the original carbon sizes to use more or less current, this may be accomplished with very little effort in the projection room by simple alterations in the gear arrangement of the positive carbon feed.

One of the latest improvements in the Peerless Magnarc is the carbon-trim alarm, regularly furnished as standard equipment on the deluxe models, which provides two signal lights mounted at the rear of the lamp to warn the projectionist if insufficient carbon remains for the showing of another reel when the arc current is cut after a changeover.

An important feature of the Magnarc is the method employed to insure correct alignment of the positive and negative carbons which consists in providing "floating" carbon clamps and rigid carbon guides near the arcing end of each carbon. The function



Peerless Magnarc 40- to 75-amp lamp.

of the carbon-end guides is to accurately locate the ends of the carbons in respect to each other. Since the positive and negative carbon clamps "float" in their respective supports, even badly warped or crooked carbons can be made to burn perfectly.

An adjustably-mounted arc-stabilizing magnet makes possible a means for the complete arc stabilization and control, and impressing of the gasses of the core of positive carbons, thereby materially increasing the percentage ratio of lumens per arc watt of the total light generated by the arc, at no increase in current or carbon costs.

The magnet is made of alnico and is a double-bevel end, bar type. It is adjustably positioned well above the axis of the carbons, so that the entire magnetic flux force is exerted against the arc crater and its gasses with an impressing effect.

Magnarc installations include not only indoor theatres but a large number of small and medium-sized drive-ins, particularly in the south.

IN THE

SPOTLIGHT

TELEVISION, for all its highly exaggerated threat to the motion picture industry is of vital interest to projectionists for a variety of reasons, not all of them on the debit side of the ledger. For example, it is estimated that from 1,500 to 3,000 projectionists are employed in television studios in the United States and Canada. Two factors are expected to double even that top figure within the next couple of years — the increasing number of new Tv stations and the rapidly increasing use of film.

Latest figures from the Federal Communications Commission show that an average of about 3 dozen new Tv stations start operations each month. Each station employs from 3 to 12 projectionists, and by striking an average of, say, 6 to a station, we find that more than 200 new jobs for projectionists are opened up each month.

John J. Francavilla, IA representative, is authority for the information that well over 5,000 members of the Alliance are now employed directly in Tv studios. The figure includes stagehands, projectionists, wardrobe people, and other IA classifications. The projectionist performs a variety of tasks, such as the showing of movies, handling of rear projection for "live" shows, the projection of slides and film commercials, and, in some studios, "riding the boom."

• Two-year contracts recently negotiated between Pittsburgh Local 171 and the Theatre Managers Association, which represents the Stanley-Warner, Loew's, Shea and Harris circuit theatres in the Pittsburgh area, provide for a 15-cent hourly wage boost for the Local membership, retroactive to October 31, 1953, with an additional 7½ cents per hour becoming effective the second year of the contract.

An important feature of the new pact is the elimination of *free* preparatory time which usually averages from 30 minutes for a new show and 15 minutes other days. Pay for this time, also retroactive to October 31 last, adds another 2½ to 3½ percent to the overall hike in pay.

• Harold Lackey, business representative for Local 337, Utica, N. Y., has been named to the arrangements committee for the forthcoming Union Label Industrial Exhibition to be held at Utica's Hotel Hamilton, May 20-22. This exhibition will be held in conjunction with the sessions of the Union Label Trades Department of New York, and it will be modeled after the shows which are sponsored in the larger cities by the AFL's Union Label Trades Dept. It is expected that a large number of New York State AFL affiliates will be represented.

• The annual installation dinner and dance of the 25-30 Club was a lively affair with little time devoted to speeches and the greater part of the evening reserved for merrymaking. A highlight of the affair, which was held last month at Zimmerman's Hungaria in New York, was the presentation of a life-size portrait of the late Mike Berkowitz, a former president of the Club, to his widow.

Among the invited guests attending the party were Arthur E. Meyer and Barry Passman of International Projector Corp.; Allen Smith, National Theatre Supply; Paul Reis, National Carbon, and Bernard Scholtz, of RCA. Souvenirs ranging from pocket memo books from IPC, to pocket flash lights from NCC, and pocket diaries from RCA were distributed to all the guests.

Out-of-town Locals were represented by a delegation from Local 384, Hudson Co., N. J., which included Al DeTitta, Ralph DeMea, John Contoli, Tom Nethery, Tony Boscorelli, and past Club presidents Al Kaye and Ed Dougherty. From Local 640, Nassau County, N. Y., came Joe Engel. Westchester Co. Local 650, N. Y., was represented by Fred Thome. Among the Local 306 members present were Ernie Lang, Isidore Schwartz, Harry Garfman, Charles Eichhorn, Mike Springer, Eddie Stewart, Charles Muller, and Wally Burns. Judge Nat Doragoff, member of Local 306 and chairman of the N. Y. State Workmens Compensation Commission, was also present, as were IP's Fred Hodgson and James Morris.

The 25-30 Club officers for 1954 are Abe Kessler, president Jacob S. Winick, vice-president; Morris I. Klapholz, secretary; Benjamin Stern,



Oscar Rosenbaum, member of New York Local 306, whose hobby is painting, proudly stands next to the portrait he painted of the late Mike Berkowitz which the 25-30 Club presented to the widow at the group's annual dinner.



Morris J. Rotker (center), past president of the 25-30 Club, installing the newly elected officers. Shown above, left to right: Anthony Boscorelli (L. 384, Hudson Co., N. J.), trustee; Jacob S. Winick (L. 306, NYC), vice president; Abraham Kessler (L. 306), president; Rotker; Abe Seligman (L. 306), sergeant-at-arms; Abraham Stern (L. 306), financial secretary, and Morris I. Klapholz, (L. 306), recording secretary.

financial-secretary; Abe Seligman, sergeant-at-arms, and Julius Wetzler, trustee.

• The long drawn out negotiations between Local 348, Vancouver, Canada, and the Famous Players theatres in the Local's jurisdiction, seem to have reached a stalemate. The Local rejected the latest award of the conciliation board and Orin M. Jacobson, International representative, has been appointed to investigate the case.

• At the January meeting of Detroit Local 199, the membership unanimously elected President Frank Kinsora to the office of business representative, to succeed ailing Roger



Frank Kinsora, business representative, Detroit Local 199

Kennedy whose illness forced him to resign from office. Deeply appreciative of the loyalty of the members, Kinsora requested this department to publicly extend his thanks to them for their confidence in his ability to cope with the many problems confronting the local. He has been a member of 199 for the past 42 years and has held various offices. He is a native of Detroit, a veteran of World War I, and is the father of three sons, all of whom are veterans of World War II.

• IA President Richard F. Walsh has been named chairman of the labor committee for the film industry's 1954 Brotherhood Week campaign.

• A catastrophe was averted last month when 1,600 patrons watching a movie at the Granat Theatre in Mexico City were hurried out of the burning building just before the roof collapsed. It is reported that 10 persons suffered minor injuries. The spectacular blaze, which was caused by an explosion in the projection room of the theatre, reduced the building to a shambles within one hour.

• A gold life membership card in Local 205, Austin, Texas, was awarded to the well-known exhibitor, Louis Novy, head of Trans-Texas Theatres, in recognition of his friendly relations with the Local extending over a period of many years. The presentation was made by Local officials Frank Sykes, Jr., president, and C. W. Schubert, business representative.

• Lawrence J. Katz, IA representative, assisted Local 561, Johnstown, Penna. officials in negotiating a new three-year contract with the Stanley Warner and Fabian Theatres. Details of the agreement have not been announced but it is said to allow for substantial wage increases.

• We enjoyed a very pleasant visit with Douglas Cameron, member of Toronto Local 173, who spent several days in New York last month on a business trip.

• Morris J. Rotker, member of New York Local 306 and former president of the 25-30 Club, was re-appointed to the Local School Board, District No. 19, Bronx, N. Y., for a five-year term. The appointment was followed by his election to the office of secretary of the Board.

• Prentiss E. Flowers, charter member of Local 400, Alexandria, La., has returned to work after an illness of nine months, four of which were spent in a local hospital.

• According to a survey made by the *New York Times*, craft workers in the West Coast motion picture studios lost at least 900 days of work during the year 1953 because of films made abroad by American producers. The survey further reports that at least 1,000 craft workers, not including performers in the bit roles and extras, were affected.

In a recent trade announcement, IA President Walsh stated that the IA did not object to pictures made in foreign countries where frozen American funds were involved or when it was necessary to obtain authentic foreign locales, but he did voice strenuous objections to those producers who went abroad for the express purpose of obtaining cheap labor. He referred particularly to those producers who made film commercials abroad to be used in this country to "sell American products to the American people."



Paramount producer George Pal (left) hosts James W. Hickey, business representative, Local 159, Portland, Ore., and Mrs. Hickey on the set of "Conquest of Space." In addition to his duties as an officer of the Local, Hickey works as a projectionist at the Oriental Theatre in Portland. Behind Mrs. Hickey is seen Eric Fleming of the picture's cast.

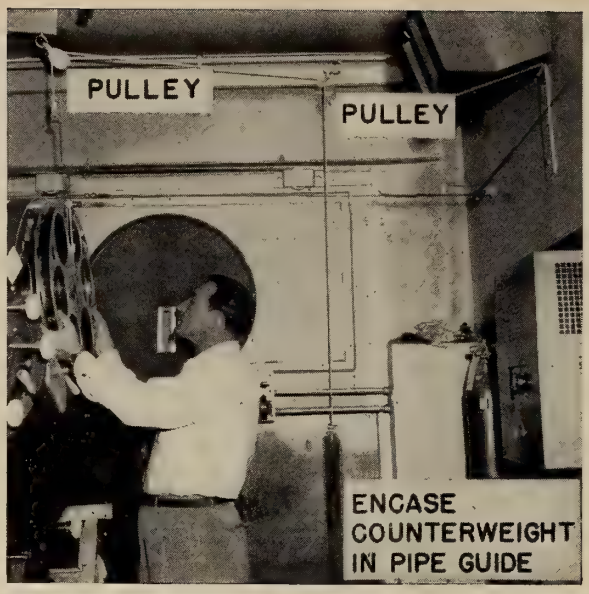
• The recent re-election of Charles F. Wheeler as secretary-treasurer of Local 108, Geneva, N. Y., marks his 22nd year as an official of the Local. His side-kick, E. Francis Larham, is serving his 8th consecutive term as business representative.

• Copies of the 96-page booklet, "American Labor Looks at the World" (Volume VII), is now available at 50 cents each from the Free Trade Union Committee, AFL, Box 65, Radio City Station, New York 19, N. Y.



Herman Gelber, president of New York Local 306, being congratulated by IA President Walsh upon his installation into office last month. Participating in the ceremonies may be seen the following Local 306 officers, left to right: Steve D'Inzillo, N. Y. business representative; Frank J. Inciardi, executive board; Archie Hollander (his head may be seen peeping out behind Inciardi's shoulder), retirement board; Al Kunze, vice-president; Max Kessler, executive board; Charles F. Eichhorn, retirement board; Walsh; Herman Boritz and Frank E. Miller, executive board; Gelber; Max Aidikoff, sick committee; David Shapiro, retirement board; Artie Klein, sick committee; Ernie Lang (seated), recording-secretary; Herman Stoller, sergeant-at-arms; Harry Garfman, Brooklyn business representative; Al Ashkinos, executive board, and Phil Shafran.





The simple combination of a hook and counterweight, mounted as shown in the two illustrations above, can make life much easier and safer for projectionists. Note the ease with which the heavy reel is lifted to the eye-height spindle of the projector.

3-D Is Job For Men of Muscle

So a safety-conscious insurance company executive comes up with a system of pulleys and hoists to make life healthier and happier for projectionists

By ROBERT L. MOORE

DID YOU EVER haul an old-fashioned "lightweight" reel up the rungs of an iron ladder from the rear of the back balcony into the projection room aerie of a motion picture theatre? Remember away back in the dim and distant past (last year!) how much those things weighed?

You can't do that with the new babies, the 3-D and Cinerama monsters of 1954 — not without leaving yourself open to an uncomfortable hernia and an aching back.

Unless you rig up a very simple system of a pulley, a wire and a counterweight.

Reel Hazard

However, and this is important, despite the pulleys and the counterweights, hand-handling of the new king-sized reels is still essential. So the next time the boss asks you to lug a mile and a half of film from here to there (an 8,000-foot reel contains just about 1½ miles of film) play it safe and protect your health.

Make no mistake about it, the new and heavier film reels for the new techniques represent a real hazard for both projectionists and shipping personnel. For projectionists there is a double hazard. The film has to be brought from the lobby to the projection room (and sometimes projectionists do that job) and it has to be mounted on the projector as well.

Safety Tricks

Cinerama reels, for example, may reach three feet in diameter, weigh as much as 60 pounds and hold 8,000 feet of film. Although CinemaScope reels are on the lighter side, they, too, should be handled with care.

The usual shipping procedure is to put two separate reels in one can so, even for ordinary 5,000-foot reels, these reels may reach a weight of from 90 to 100 pounds. What then is the 3-D, CinemaScope and Cinerama picture? It's black and blue, with sound effects, if you drop a reel on your toes!

Below are some of the tricks worked out for safety's sake in the handling of the block-buster reels:

Get the manager to obtain a spare 3-D film can, parked permanently in some storage space on the lobby floor of the theatre where it is handy when the delivery truck comes around.

When the usher, the porter, or whoever else does that job, receives the can of film in the lobby, he takes out one reel. This is placed in an ordinary newspaper boy's canvas sack, or some similar bag, and the one reel and the spare can be carried to the projection room (using a hoist if you have the old iron ladder business).

Tripping Hazard

In the projection room the reel is immediately taken from the bag and placed in the can. Then the porter (or whoever) return to the lobby for the second reel. This is carried in the bag to the projection room and placed in the can with the first reel.

Never, but never, allow a reel to lie on the floor or stand vertically. There's a tripping hazard and, in addition to breaking a leg, the film might be injured.

A good idea, too, is to have a special cart (see illustration) for moving the film cans up stairways. The best type consists of two sets of three rubber tires which allow a direct pull as the handler precedes the cart up the stairs.

Nylon Strap

Another method, also illustrated, involves a nylon carrying strap. The strap fits over the shoulder and the carrier uses his hand to carry part of



The strain of lugging heavy reels up theatre stairs is eliminated by means of this specially designed cart. It has two sets of three rubber - tired wheels.

* Mr. Moore is director of the Technical and Engineering Division, Safety Engineering Department, Lumbermans Mutual Casualty Co., of Chicago, Ill.



An adjustable nylon carrying strap makes the job of carrying a film can much easier. For safety's sake, grasp the hand rail. Also help distribute the weight by using the handle. A 3-D can loaded with two reels is definitely a two-man job.

the load by its top handle. While the combination of strap and handle helps to distribute the load over the body, this is still an unwieldy way of lugging film cans around. Incidentally, the strap is attached by simply opening the can and running the nylon strap under the lid, remembering to close the lid securely over the strap. The strap may be equipped with an adjustable buckle so that it may be carried by men of assorted sizes.

The container, or carrying can, is equipped with two side handles and a two-man operation should be insisted on wherever and whenever possible. Then the total weight can be halved and properly distributed. This should, without question, be a two-man operation whenever two reels are carried at one time.

Sash Weight Hoist

Once the can is in the projection room, the problem is a bit simpler than getting it up the stairs. Reels must be lifted by the projectionist to approximately eye-height to place them on the spindle of the projector. Because of the awkward lifting job involved this constitutes a very definite hernia hazard if not handled properly.

For the lifting job a counterweight arrangement, as illustrated, with a hook of some simple design is suggested. The hook for the job holds the reel in place by a spring. This engages one side of the reel so that it may be easily unhooked after the reel is mounted on the spindle. A sash weight only slightly lighter than the full reel will provide the counterweight. Obviously, the projectionist is only called upon to lift the difference between the full reel and the weight.

Big reels, and perhaps even bigger reels, seem to be very much the style for today and for the future. Handling them shouldn't be too difficult a task for the projectionist who knows the score. And just think of the advantages over the small reel, what with half the number of changeovers and thus exactly half the chances for trouble!

Like it or not, big reels are here!



A newsboy's canvas bag is just the ticket for lugging 3-D reels around—one reel at a time. Try carrying two and you're just begging for something to happen. Pictures courtesy of National Safety News Magazine.

Film Industry Profits Rise Despite Forebodings

Despite the dire predictions of bankruptcy prevalent last summer, it would seem that most theatre circuits and producing companies earned increased profits during 1953 and were faring better than industry in general. This was indicated by a check of motion picture securities with the general average of 50 leading stocks as compiled by the *New York Times* and by reports from other sources.

Reports from leading theatre circuits on gross profits during the closing months of 1953 indicated scarcely any instance where box office revenues were not reported at least slightly in excess of 1952. In some cases the reports indicated business as 10 percent and more over 1952.

Credit for the increase has been given both to the availability of pictures with more powerful boxoffice pull, and to a new interest in motion pictures on the part of the public created by the introduction of the new processes, CinemaScope and 3-D. Another factor mentioned was that Tv set purchases have reached something close to a saturation point in most heavy-population areas. It is also said that people are getting back into the habit of going out when superior entertainment is available.

Ten common stock issues, Allied Artists, Columbia, Loew's, National Theatres, Paramount, Republic, RKO Pictures, RKO Theatres, 20th Century-Fox and Universal, showed a gain of 23 7/8 points or an average gain of 2.38 points. This contrasts with an average loss during 1953 of 18.48 points in the *New York Times* average of 50 leading stocks issued by a variety of industries.

Theatre circuits which registered gains during 1953 include National Theatres, which paid 30 cents a share on its common stock, valued at 6⅞ dollars a share at year's end, a gain of 2 7/8 dollars or points over 1952. RKO Theatres paid 15 cents a share in 1953 on common stock valued at 4¼ dollars a share at year's end, 1¼ points over its value at the end of 1952. Loew's, Inc., paid 80 cents a share on its common stock which stood at $13 a share at year's end, ¼ of a point more than at the end of 1952.

In the motion picture production field, business also improved in 1953, according to profit reports. Considerable gains were registered by Columbia and 20th Century-Fox, with Warner Brothers remaining in approximately the same profit position.

Columbia Pictures common stock, valued at 20¾ dollars a share at year's end, was 8¼ points higher than last year. 20th Century-Fox stock rose to 20½ dollars at the end of the year, gaining 7⅛ points and paying $1 per share for the year.

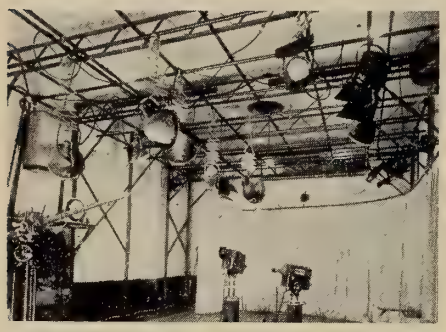
Allied Artists common stock was selling for 5½ dollars a share at year's end, 2⅝ dollars more than at the end of 1952. Universal paid yearly dividends of $1 per share, and its common stock rose 4⅞ dollars in value during 1953 to 19¼ dollars at the end of the year.

However, some production companies did show losses. Paramount stock was down 1⅝ dollars a share for the year, RKO Pictures 1⅛, and Republic ⅝. Early this month RKO stock doubled in value in one day on Howard Hughes' statement that he was throwing an additional $23,000,000 into the company in a move to gain absolute control.

According to Dept. of Commerce figures, there were 3,400 more theatres in the United States on June 30, 1953, than on December 31, 1944.

New Products for the Industry

UNISTRUT METAL FRAMING. An easily and quickly assembled system of metal tube framing for overhead projection and production lighting in television studios



This is the Unistrut movable grid system of metal framing, designed to handle lights, microphones, wiring for projection equipment, etc., in television studios where space is at a premium. This is the installation at Station KGO-TV in San Francisco, Calif.

is being marketed by Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill. The prefabricated, completely adjustable scaffolding easily supports the 1½" nominal black pipe sections that support the actual lighting units. Portable patch plug sets are attached directly to the Unistrut.

GALLAGHER 16-MM ARC PROJECTOR. Using the Strong Junior High Intensity arc lamp and rectifier along with a specially built RCA arc head projector assembly, this new piece of 16-mm equipment operates from any AC outlet. Manufactured by Gallagher Films Inc., the projector is available through all RCA dealers.

MULTIPLE ASPECT RATIO LENS. Tests will be made shortly at the Paramount Theatre, New York, of a new set of lenses designed to enable projectionists to switch from the CinemaScope ratio of 2.55 to 1 to smaller ratios at various times during the showing of a picture. IP will carry a report on the system in a subsequent issue

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"SLICE-AWAY" TRANSISTOR BATTERIES. Tiny high-power batteries for use with transistors are announced by RCA. The new batteries can be sliced like a roll of salami into numerous combinations of cells to provide different voltage requirements. Two types are now on the market (VS087 up to 2 ma and VS088 up to 10 ma). Both are 21-volt special purpose types, intended mainly for experimental use. Each contains 15 individual ¼-volt crown-type alkaline dry cells encased in a plastic sleeve. Various power requirements from ¼ volts to 21 volts may be obtained quickly by simply slicing the battery with a knife.

ALUMINUM DRIVE-IN PAINT. Tropical Paint and Oil Co., Cleveland, Ohio, is marketing a new aluminum paint for drive-in screens which the company claims "combines general screen brightness and low light deflection with durability and weather resistance in outdoor use." The paint has been tested by the Polaroid Corporation and, according to the Tropical Co., was rated "high in brightness and clarity of angle viewing."

FIRST COLOR TV RECEIVER. Emerson Radio and Phonograph Corp. is the first manufacturer to announce for sale a color TV receiver. The price tag is $700 for the Model C-500, a console ensemble with a 16-inch tube providing a 14-inch picture.

METRO OPTICAL STEREO SOUND. Arthur M. Loew, president of Loew's International, announces a new stereophonic sound device that records sound-on-film by optical means instead of magnetic striping. The new device, says Loew, requires no changes in the present standard optical head. A device to achieve the same purpose, in which darkened intersprocket spaces on the film are used to cue sound signals, was reported in IP for October as a product of Dorsett Laboratories, Norman, Okla.

COLOR TV TESTER. Designed to measure the performance, alignment and phase errors of color television, a new testing instrument, the 1601-AR, has been introduced by Telechrome, Inc., Amityville, L. I. A calibrated chart on the cathode tube face permits the setting of standard color values and also indicated phase and burst amplitude.

GLARE SPRAY. A glare-softening Aerosol spray is offered to television and motion picture cameramen by the Crescent Portrait and Frame Co., Cleveland, Ohio. The spray gives a matte surface to shiny objects, thus eliminating bright reflections under studio lights.

CINEMASCOPE DRIVE-IN SCREEN. Claimed by the maker, Poblocki & Sons, Milwaukee, Wis., to be suitable for CinemaScope and 3-D in drive-ins, a new corrugated aluminum screen is now on the market. The screen is reported to cost from $12,000 to $20,000.

Standards? We'd All Go Crazy Without Them



Maybe the fellow in the cartoon at the right has got hold of a lens with too short a focal length —but, whatever the cause of his troubles, the cartoon is supposed to illustrate the importance of standards in motion picture projection. The cartoon, taken from a lively little booklet, "Through History With Standards," published by the American Standards Assn., shows what might happen if chaos were to return to the projection room. That is, chaos old style. In the old days (and many a projectionist remembers them with shudders) sprocket holes and film perforations were all sorts and sizes. Film was ribbed, torn, mangled and generally abused. Then, in 1916, the Society of Motion Picture Engineers, now the SMPTE (television has been added), got to work. Standards were set and, with the cooperation of the ASA Sectional Committee on Standards for Motion Pictures, these were quickly adopted internationally. Today, more than 60 American Standards prevail in the industry, most of them world-wide in effect. Now motion picture film from one country can be projected on the equipment of any other country in the world whether the machines be American or foreign.

1A ELECTIONS

LOCAL 108, GENEVA, N. Y.

Arthur J. O'Neill, *pres.;* Emerson Garling, *vice-pres.;* Charles F. Wheeler, *sec.-treas.;* E. Francis Larham, *bus. rep.;* William Baroody, Arthur Gardner, *trustees,* and E. F. Larham, *del. to State and IA Conventions.*

LOCAL 171, PITTSBURGH, PENNA.

Daniel V. Flask, Sr., *pres.;* Harold O'Donnell, *vice-pres.;* James V. Sipe, *bus. rep.;* Luther W. Thompson, *sec.-treas.;* Dean Martin, Leroy McConnell, and Charles Lang, *exec. board;* James O. Caskey, Russell R. Kerr, Michael J. Ventrone, *trustees;* Angelo Diodati, *sgt.-at-arms;* D. Flask, Sr., Henry W. Link, Sr., Paul P. Mach, and J. V. Sipe, *del to IA onvention.*

LOCAL 204, LITTLE ROCK, ARK.

Leonard Thalmueller, *pres.;* Jimmy Cowsert, *vice-pres.;* Paynter Rochelle, *rec.-cor.-treas.;* L. B. Herring, *fin. sec.;* Guy Redmond, *treas.;* J. H. Schoemaker, *bus. rep.;* Walter Melton, *sgt.-at-arms* and *trustee;* J. Sipe, *del. to IA Convention.*

LOCAL 257, OTTAWA, ONT., CANADA

James P. McGuire, *pres.;* John Macauley, *vice-pres.;* Wm. H. Hartnett, *bus. rep.;* W. Murray Hall, *sec.-treas.;* S. Ventura, *sgt.-at-arms;* E. Field, L. Lamothe, and D. M. Ritchie, *trustees.*

LOCAL 303, HAMILTON, ONT., CANADA

Harry H. Thornberry, *pres.;* Stanley L. James, *vice-pres.;* Hugh W. Usher, *bus. rep.;* John P. Owens, *treas.;* Hugh J. Sedgwick, Herb Konkle, and James C. Rowe, *exec. board.*

LOCAL 343, OMAHA, NEBR.

Alvin Kostlan, *pres.;* Ora Farmsworth, *1st vice-pres.;* C. Jones, *2nd vice-pres.;* Ross Hatton, *treas.;* J. I. Kelly, *fin. sec.;* Clyde Cooley, *sec.;* Howard Jackson, *bus. rep.;* Al Frazier, *sgt.-at-arms;* R. L. McIntyre, Clyde Blubaugh, Art Krake, *trustees.*

LOCAL 376, SYRACUSE, N. Y.

Louis R. Boyd, *pres.;* Melvin A. Denny, *vice-pres.;* George F. Raaflaub, *sec.;* Lionel B. Wilcox, *fin. sec.-treas.;* Walter M. Scarfe, *bus. rep.;* John L. Klock; *sgt.-at-arms;* Philip T. Rossomando, *del. Central Body;* Russell Stevens, Charles R. Nelson, John H. Eccles, *trustees;* Lawrence F. Sherman and Warren E. Williams, *exec. board.*

LOCAL 407, SAN ANTONIO, TEXAS

Benno J. Kusenberger, *pres.;* Alfred Pena, *vice-pres.;* Henry Villapadierna, *sec.-treas.;* Horace E. Blanton, *rec. sec.;* W. B. Keeler, *bus. rep.;* Manuel Ayala and G. A. McElyea, *members at large.*

LOCAL 440, ST. JOHN, N. B.

Louis J. McCourt, *pres.;* L. Edward Laird, A. T. Wedge, *vice-pres.;* Cecil Beesley, *rec.-sec.;* James A. Whitebone, *bus. rep.;* R. J. Foulds, *treas.;* A. S. Olive, M. F. Brown, L. A. Chatterton, *trustees.*

Color motion pictures were first exhibited in 1908 at the Society of Arts in London. Two colors were used and the inventor, G. A. Smith, had trouble keeping them in sync.





Free Polaroid Land Camera

- The Picture-a-minute Camera -

for the best letters on

3-D

projection

Have you written Your letter?

If you're a working projectionist, if you know any 3-D tricks, if your ideas can improve stereoscopic projection, then you stand a good chance to win one of these camera beauties as offered by the Polaroid Corp. in cooperation with your magazine

LETTERS from projectionists are beginning to roll into the IP office as men of the craft unburden themselves of their ideas on 3-D projection. The winner of the first Polaroid Land Camera will be announced in the next issue (March) of this magazine.

The contest will run for three months, with the Polaroid Corp. cooperating with IP in a joint effort to find out just what projectionists think about 3-D — and what they're doing about it in their own theatres.

The contest is open to working projectionists only. Letters with your ideas and suggestions will be judged by a three-man panel: Dr. Lewis Chubb, Polaroid research physicist; Henry Kogel, SMPTE staff engineer, and by your editor as the third man. What we want is simply this:

Your suggestions on how to make 3-D better. Any tricks you may have devised in your own projection room, tricks that improve your 3-D projection. For example, one theatre we know has an ordinary carpenter's spirit level handy so that the 3-D filters at the ports may be kept absolutely horizontal. If you've had a brain wave like that, send it in!

If you've found a way to out-smart the exchanges and their sometimes amazing inspection systems, let's hear about it!

In other words, if you, as a working projectionist, have an idea or a suggestion you think is good don't hesitate. Don't walk, run to the nearest mailbox.

You don't have to be a Hemingway. We don't care how the letters are written. It's the subject matter that counts.

Address your letters to the 3-D Editor, *International Projectionist,* 19 West 44th St., New York 36, N. Y.

Write as many letters as you like. And if you don't win the first camera, try again and you may win the second —or the third camera to be offered.

Incidentally, the Polaroid Land Camera is a honey. It's that famous new camera you've been reading about, the one that develops its own pictures in just one minute. The price, if you had to buy it, is a neat $89.75 (and worth every nickel of it!).

The Polaroid Land Camera gives you photography at its quickest, easiest and simplest. One adjustment takes care of all shutter and lens settings. All you do is snap the shutter, pull a paper tab and, voila!, in one minute by the clock you have your picture. Prints are black and white and are big 3¼" by 4¼" — and they can be enlarged or duplicated, too, if you like.

So get you're letters in — fast! To qualify for April's camera your letter must be in the IP office no later than March 15th. All letters shall become the property of IP.

Here's wishing you luck!

Good projection is the key to good 3-D

BOOK REVIEW

THE THEORY OF STEREOSCOPIC TRANSMISSION AND ITS APPLICATION TO THE MOTION PICTURE. By Raymond and Nigel Spottiswoode. 177 *pages and appendices.* With stereoscopic diagrams by Brian Borthwick. *University of California Press.* $6.00.

The Messers Spottiswoode, who should be well known to IP readers for their work in the 3-D field, have taken the mathematical approach to the third dimension in this highly technical exposition of the subject. The writers in the present study look on 3-D as a science, rather than as an art. From the vantage point of this editorial sanctum, wearing bifocals instead of anaglyph spectacles, we are willing to admit that 3-D is complicated but, in its present state at least, we fail to see it either as an art or as a science. Some of the first pictures in the film industry's recent splurge into the medium were apparently produced by people who never got out of fifth grade and we're afraid they'd find this book, with its plethora of equations, rather tough going.

The study is complete, perhaps a bit too complete, except in one department, that of projection. There is some discussion of systems and processes from the point of view of the man behind the projector but one wishes that the Spottiswoodes had given this some additional attention. Curiously, the authors evaluate four systems, the long-awaited Vectograph in which two self-polarized images are carried on one film strip, alternate frame projection, split image projection and the familiar double-band projection of "Bwana Devil," "Hondo" and "Kiss Me Kate." The Spottiswoodes state quite flatly that the Vectograph, because of its simplicity of handling in the projection room, is the best system for commercial projection. However, they also state that the two-film, two-projector system, with all its synchronization difficulties, is the best all-round process when the very tops in 3-D excellence is desired. However, their comment on the double-film is quite interesting. The (double film) system, they write, "has great advantages for production screening in the studio." We know a couple of projectionists who would like to confine it to that limited area, the studio, and keep it out of the theatres.

First 'Scope Theatre

The first theatre to be built especially for CinemaScope, 3-D and the other new projection and sound reproduction methods is planned for a large new suburban shopping center to be built on the site of Roosevelt Field, Long Island, N. Y.

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NEW YORK OFFICE: 30 CHURCH ST., NEW YORK 7, N. Y.

TYPES OF FILM DAMAGE

(Continued from page 10)

damage to the film during projection.

On the subject of extra and unsightly cue marks, exchanges in the New York area were less vocal. Except for prints used a great many times, this did not present a serious problem. The practice of putting confusing and unsightly marks on leaders and using picture-defacing slashes as cue marks at the end of a reel has greatly decreased in recent years, the inspectors agreed.

However, since more than one projectionist has written to this office recently on this problem, it is worth repeating some advice contained in an article by Robert A. Mitchell, "Projection Room Handling of Film Prints," IP for March, 1948.

Care of Leaders

"In the matter of conserving leaders, projectionists can help by using great care in threading and by refraining from marking reel numbers, titles, etc., on the leaders with indelible ink," Mr. Mitchell stated. "Notations should be confined to the first few feet of the plain 'protection leader' and then written only with easily-erased cellophane marking crayon or grease pencil.

"The painting of squares and crosses on threading-up footage-number frames has high nuisance value, as has also the cementing of opaque strips of film across leaders.

"Inasmuch as the standard release print depends for its effectiveness on the exact positioning of the cues and leader footage numbers, projection efficiency is reduced when these have been mutilated. It is the responsibility of the distributor to replace leaders which have been unduly shortened through repeated use, and it also behooves him not to overdo the replacement of film to the extent of interposing several yards of black film between footage numbers and the start of the picture. Such excess footage must be removed.

"The motor start and changeover cues are frequently rendered unsightly by projectionists who fear that they may not catch the printed cues when they flash on the screen. Much worse is scratching curtain cues into the emulsion, for their presence is likely to confuse the projectionists who subsequently use the film. Curtain and lighting cues should be marked on the film with crayon, and then wiped off when the film has completed its run.



Magazine valve rollers, shown in the above illustration, can be responsible for much damage to film when dirt, oil or chips of film accumulate around them and may prevent them from turning freely. The results are vertical scratches running up and down the emulsion or the support side of the film.

"Motor start and changeover cues which are really too faint to be seen on the screen may be rendered visible by lightly scoring them with a regular cue-marking device, several of which are on the market. Holes should never be punched in the film."

In conclusion something should be said regarding film damage problems in connection with the new CinemaScope film. Josephine McGrath, chief inspector at the 20th Century-Fox New York exchange, was inclined to feel that exchanges and projectionists still have a lot to learn in processing the new film with its smaller sprocket holes and four magnetic tracks.

CinemaScope Film

Some annoying problems have come up at the exchange, including balkiness of some of the big semi-automatic splicing machines in handling the film which must be scraped on both sides. Also, considerably more care must be exercised in inspecting CinemaScope prints because of the exposed position of the magnetic tracks. (See "Splicing for 3-D and CinemaScope" in the December, 1953, IP.)

The types of damage covered in this article are not meant to comprise an all-inclusive list. Not covered, for instance, is the severe buckling and blistering of film caused by excessive projection temperatures, something that happens most often at drive-in theatres, or the fact that considerable damage is done to film shipped badly wound in deformed or dented cans and reels or by cans being thrown around during transit.

"Common Causes of Film Damage to 35-mm Release Prints," published by Eastman Kodak, covers the subject in detail all the way from the laboratory to the projection room.

Motiograph Offers "Raincoat" In-Car Speaker

With Spring not so far away, and with drive-in operators preparing for what they hope will be banner business, Motiograph is drawing industry attention to its improved "Rainmaster" in-car speakers.

Covering the face of the unit is a taut linen cover impregnated with a chemical which makes it rainproof and dustproof. This, Motiograph claims, makes the speaker impervious to all kind of weather, from cloudbursts to duststorms, and so doubles the life of the unit.

Speaker and box are made of aluminum for extreme lightness. The "Rainmaster" is designed to fit practically any make or model of junction box, so that it may be ordered with or without its junction companion. The junction has multi-tapped transformers which permit exact impedance matching with any make or model of sound reproducing equipment.



The Motiograph Rainmaster

Westrex Has Stereophonic Conversion Unit

PROJECTIONISTS familiar with the Westrex R9 penthouse reproducer for stereophonic sound will be interested in the company's new penthouse stereophonic modification unit for the 1035 single-track magnetic recording system. The unit is illustrated on this page.

The new modification unit adds the facility for the recording and monitoring of three or four magnetic tracks to the basic single magnetic track RA-1467A recorder now used in studios throughout the world.

The new conversion unit is mounted between the recorder and the reel assembly and contains a film driven filter and the magnetic heads. The film is driven by a 32-tooth sprocket and the magnetic recording is quality-regulated by the Davis drive filter. The film also passes over two impedence drums between which are located the two magnetic head assemblies. The unit, Westrex claims, does not interfere in any way with the operation of the regular single-track system.

The film pulling mechanism of the conversion unit floats on four rubber mountings to reduce vibration and to permit transportation of the unit without removing the twin flywheels on the impedence drum shafts.

For convenience in threading, the sprocket is provided with detents associated with both pad arms. When either arm is open the sprocket is restrained from moving.

The roller is normally set for the takeup reel to run clockwise but by crossing the takeup belt the roller direction may be reversed. The multiple track magnetic head circuits terminate in receptacles on the rear of the adapter case. The pad arms may be adjusted for film clearance by two screws which secure the base of the of the pad arm assembly.

The impedence drums and the filter rollers have sealed ball bearings containing light oil and, according to Westrex, little attention is required. The idler rollers are made of graphite impregnated nylon.

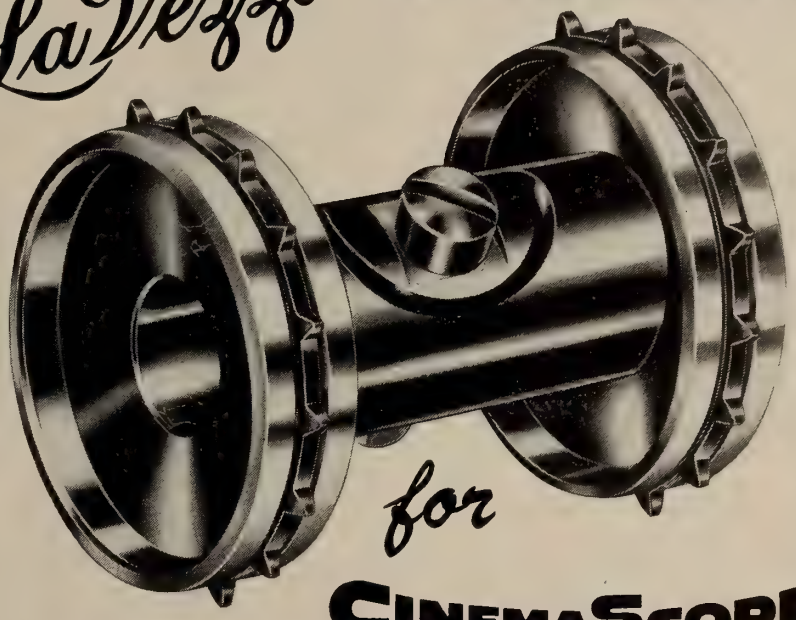
The conversion unit is available for multiple track stereo recording with three tracks in the ASA position, four-track CinemaScope master, or four-track CinemaScope release positions.



This is the Westrex stereophonic modification unit designed for greater facility in monitoring and recording the three or four magnetic tracks to the Westrex single track recorder.

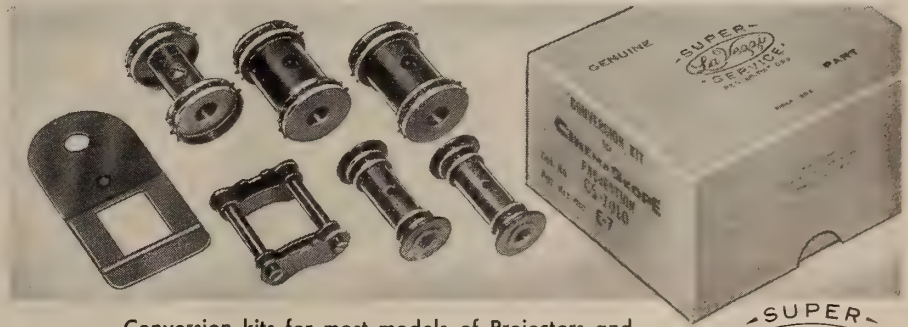
The British navy has developed a 3-D television camera for use at depths down to 1,000 feet beneath the surface.

LaVezzi SPROCKETS



for CINEMASCOPE

The new wide screen presentations demand rock steady projection which for years exhibitors have been expecting and getting by using LaVezzi sprockets. In addition, the clean burr-free teeth are easier on the film—an important factor with the narrow perforations of the four stripe magnetic film. LaVezzi sprockets are properly engineered to resist wear—and are hardened for that extra margin of usable life. For better projection and peace of mind get LaVezzi and be sure!



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Big Future Seen for the New Giant Magazines

Even bigger film reels than the 25-inch giants of today are seen for the future by C J. Williams, sales manager for the Wenzel Projector Co., Chicago.

"The film load of a single reel today," Mr. Williams told IP, "is limited only by the ability of the projector to handle the longer footage magazine, and by the dimensions of the projection room where the bigger machines must be installed."

There has been much discussion in the industry ever since the advent of 3-D and Cinerama over the advisability of the big reel. Arguments pro and con have been heard, with some projectionists preferring the giants because of fewer changeovers. Others complained about the weight and difficulty in handling.

Mr. Williams believes that the changeover advantage is now, and will be in the future, the ruling factor.

"At the start of motion pictures," he said, "reels of 400-feet and 500-feet were considered standard. As the industry grew, the reel grew also. The average became 1,000 feet.

"Then, for the same reason as now, the contents of a single reel jumped to 2,000 feet. The reason, of course, was changeover. The size stopped at that footage because film was highly inflammable and it was considered dangerous to have reels any bigger. Now, with safety film almost universal, a reel can be loaded with 5,000 feet of film, or more, without endangering anyone.

"The first 3-D pictures proved conclusively the ability of projectors to handle 5,500 feet of film on one reel. There seems to be a fast growing opinion that 3-D is in revival and, whether it is run on a single strip of film or on two interlocked projectors, there still remains a strong argument for the 25-inch magazine.

Large Reels Practical

"These big fellows have proved that they are practical in use, that they decrease the possibility of a bad changeover by 50 percent and that they give the projectionist more time to attend to his other ever-increasing duties. Those who say that the big reels are too hard to handle might remember that the same objection was raised when film footage jumped from 1,000 to 2,000 feet.

"With the 25-inch magazines, as they are being made today, with double ball-bearing shafts, suitable gauge cases and covers, and specially designed brackets, hinges and take-ups, together with the comparable price of the 18-inch magazine, plus the fact that any amount of film can be used from 400 feet up to the full capacity of the magazine, it only remains to sum up the magazine situation, as I see it, in this manner:

"The use of 25-inch diameter magazines, where projection room conditions are suitable or can be made so, has a very definite spot in the immediate future of the motion picture industry."

RCA Honors Engineers

Four engineers credited with important contributions to the development of color television were among 20 employees of the Radio Corp. of America who recently received the RCA Award of Merit, the company's top citation for salaried employees. They are: Wallace M. James, engineering manager of the Receiving Tube and Transistor Operations Division; Robert K. Lockhart, design and development engineer at the Camden, N. J., plant; John W. Wentworth, leader of the television terminal design and color projects group in Camden, and Steven Wlasuk, engineering manager for a special projects group at the RCA Service Co.

Snaider Theatre TV on Market

Joseph Snaider, president of the Snaider Television Corp., announces that theatre TV equipment produced by the firm is available to exhibitors on a direct cash-purchase basis in addition to the installment purchase deal arranged by Box Office Television, Inc., promoter of theatre TV shows.

In addition to Snaider portable and RCA permanent equipment, BOTV is said to be willing to finance exhibitor purchases of Trad Theatre TV equipment. Terms call for theatres to pay installation costs, plus one year's rental in advance, and agree to carry all BOTV theatre telecasts that are offered weekday evenings on a straight 50-50 boxoffice split. BOTV, in turn, finances the purchase of the equipment and guarantees a minimum of 30 telecasts a year.



Altec's current installation rate accounts for 75% of total stereophonic sound sales!

Broadway or Main Street, theatre owners know Altec's engineering skill and know-how assure perfect installation, sure service.

That's why Brandt's GLOBE, Broadway, New York, (pop. 8,000,000) and the OPERA HOUSE, Lebanon, New Hampshire, (pop. 4,614) signed Altec stereophonic installation and service contracts!



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OBITUARIES

EDWARD A. MEILINK, SR., 59, member of Local 228, Toledo, Ohio, died January 24 after a brief illness. For the past 13 years he was employed as projectionist at the Pantheon Theatre. He was a 32nd degree Mason and a member of Damascus Lodge, Fort Meigs Chapter, RAM; Toledo Commandery, Toledo Council, RNSN, and Ancient Accepted Scottish Rite, Valley of Toledo. Survivors are his wife, two daughters and one son.

FRED LEROY SOWASH, 61, president of Local 430, Eureka, Calif., died December 19 after a long illness. He was a member of the Eureka Local for the last 11 years, serving as president the past year. He also served one term as secretary-treasurer and for the past four years as assistant business representative. He worked as projectionist in a number of theatres in Eureka.

An accomplished musician, Sowash took extra training at the University of California and San Francisco State College, where he majored in reed, brass and string instruments. He directed the Eureka municipal band, local minstrel shows, and field day parades. He served as band sergeant in World War I, and after the war he organized the American Legion Drum and Bugle Corps in which he was active for many years. He was a member of Humboldt Lodge No. 79, F. and A. M., and of Fort Humboldt Post American Legion. Surviving are his wife, three sons and two daughters.

EDWIN BORCHARDT, 56, member of Milwaukee Local 164, died of a heart attack last month. He was found lying on the balcony steps of the Oriental Theatre, where he had been employed for the past 15 years. He evidently was stricken while on his way to the projection room. Borchardt became an apprentice member of Local 164 back in 1917. In 1918 he joined the U. S. Armed forces and served in World War I. Upon his return from overseas he resumed his apprenticeship in the Local and in 1922 was accepted as a full-fledged member. His sudden death was a shock to his brother craftsmen. He was unmarried and his survivors are several cousins and distant relatives.

FRANK M. DELORENZO, member of Milwaukee Local 164 since 1912, died several months ago. He was very active in the affairs of the Local and served in various official capacities. At the time of his death he was employed at Stanley-Warner's downtown Alhambra Theatre in Milwaukee. He was one of the real old-timers in the movie industry, having worked as manager for the Selznik Film Exchange in Milwaukee and Omaha, and also as a salesman for Metro. Many years ago, he and his brother John, also a member of the Local, operated the first poster mounting service in Milwaukee and Minneapolis.

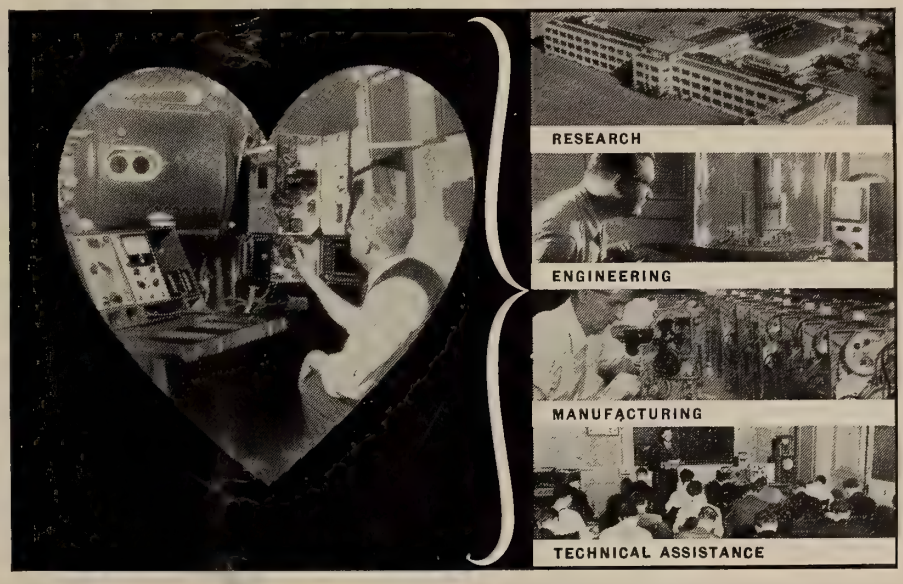
Frank DeLorenzo was noted for his wit and great sense of humor. He was praised for his hospitality and was at his best when entertaining his many friends at his home. Survivors are his wife Mabel, one son Comm. Frank L. DeLorenzo, USN, now stationed in Trinidad, B. W. I., four brothers, and one sister.

ARTHUR C. WARD, 41, member of Local 396, Binghamton, N. Y., and projectionist at the State Theatre in Union District, died December 23 of a heart attack. He was a veteran of World War II, having served in the Asiatic-Pacific theatre. He was a member of Maj. Ray Humphrey, DSC., Post 1449, VFW of Endicott, N. Y.; Loyal Order of Moose 1065; Fraternal Order of Eagles, Aerie 2269, and of the George F. Johnson Post 1700 of West Endicott. Survivors are his wife, two daughters and three sons.

CHARLES E. MASON, 74, charter member of Local 253, Rochester, N. Y., died January 18. A native of Rochester, he joined the Local in 1904, and for 20 years was projectionist at the Temple Theatre. When use of the Temple was discontinued several years ago, he became projectionist at the Regent Theatre. He was an expert craftsman and often was called upon to create special lighting effects for shows playing in Rochester. He also was projectionist for the Memorial Art Gallery movies. Survivors include his wife, one daughter and one son.

Tape Men Organize

Formation of the Magnetic Recording Industry Association is announced with Joseph R. Hards, of A-V Tape Libraries, New York, as president, Russell Tinkham, of Ampex, vice president.



Finest Theatre Service—*Anywhere*

BACK of every RCA Theatre Service engineer are all the resources and facilities of the Radio Corporation of America. No technical problem in theatre sound or projection is too difficult for RCA Service engineers to tackle and solve . . . for YOU!

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Canada Doubles Number of Theatre Seats

THE MOVIE business is booming in Canada with new drive-in theatres accounting for a good portion of the gains noted for 1953. According to statistics compiled by *Canadian Film Weekly*, Toronto, 123 new theatres appeared in the Dominion last year — 78 drive-ins and 45 standard theatres.

In addition, 26 new theatres, including 16 drive-ins and ten standard houses, were under construction at the end of the year. Thirty-three theatres, including 14 drive-ins and 19 standards, are on architects' drawing boards.

Figures released by the Dominion Bureau of Statistics, Ottawa, when combined with data published by *Canadian Film Weekly*, show a really amazing gain in motion picture theatres during the past 15 years — almost double the number of seats in that comparatively short period.

In 1938 the seating capacity of all Canadian theatres, according to government figures, was 658,174.

At the end of 1952 seating capacity was 1, 106, 316, including some 16-mm seating, a jump of 448,142 in 14 years. To this add *Film Weekly's* figures for the 1953 gain and we have an approximate 1,206,000 number of seats, almost double the 1938 figure.

While some of the gain may be put down to the addition of the former Crown Colony of Newfoundland to Canada as a tenth province, it is pointed out that this is but a small factor. There are but 28 theatres in the new province and the seating capacity is well under 15,000. The largest theatre on the island is the Paramount in St. John's, 1,195 seats, followed by the York, also in St. John's, with 1,100 seats.

The figures are all the more remarkable when it is remembered that the period from 1938 to 1953 saw great expansion in the radio and television fields. Canadian film men, it is pointed out, do not seem to fear the impact of television as a rival.

As one Canadian projectionist put it when he visited IP's office in New York:

"This is good news for the boys in the projection rooms. Every new theatre means more projectionists."



PAT ON THE BACK DEPT.

To the Editor of IP:

. . . If I may, I'd like to commend you on the material and on the various topics covered in your publication. It should be a weekly magazine. It seems too long between issues. I'm always looking forward to the next one! Keep up the splendid work!

PETER R. SADESKY
Secretary, Local 461
St. Catharines, Ont.

Mobile Cinerama Camera Unit

The first mobile camera unit for the production of the next Cinerama production, "The Thrill of Your Life," has been delivered to Cinerama's Oyster Bay, N. Y., headquarters. The unit consists of three large trucks, the first containing Cinerama's triple camera, the second, the stereophonic sound equipment and the third for general utility. The first unit will be used by producer Louis deRochemont in Europe. A second group of trucks will soon be ready for use in the United States.

New Industry Museum

The old Warner Brothers studio on Sunset Blvd. in Hollywood, regarded as the birthplace of the talking picture, will soon become a combination television center and museum. The property has been sold to Paramount as a future home for its Los Angeles Tv station, KTLA. Paramount has agreed to make a portion of the building available to the Motion Picture Relief Fund for the establishment of an industry museum.

SPLICES NOT HOLDING ?

Film breaks are costly. Play safe by using

JEFRONA

All-purpose CEMENT

Has greater adhesive qualities. Don't take our word for it. Send for FREE sample and judge for yourself.

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1600 Broadway New York 19, N. Y.

PENSION PROTECTION

(Continued from page 19)

Aside from the question of greater expense, there are certain advantages in hiring an independent actuary rather than relying on an insurance agent. The professional consultant will not be interested in selling any particular product or type of plan as against some other plan which might be better adapted to the needs and desires of the group. He will be on hand for consultation, to answer technical questions and to give advice if needed, at the time it is needed.

Local unions that are about to negotiate a retirement plan should consider the possibility of an arrangement with the employer whereby they might jointly engage an impartial actuary to provide the necessary cost estimates, and to whom technical questions might be referred by both parties. If relations with the employer are such as to make this possible, it would certainly be the most economical approach.

If this is done, care should of course be taken in the selection of the actuarial consultant. Private consulting firms have generally in the past derived most of their revenue from employer business, and many — if not most — of them are well saturated with the employer point of view. However, there are a number of consultants that do a good bit of trade union as well as employer business and are equipped to provide thorough, fair and impartial service.

Before the cost of financing a particular plan can be estimated, the actuary or insurance company must have certain data on the workers who are to be covered by the plan. The following facts on each individual worker in the group to be covered by the plan should be collected: (1) Rate of pay (if the benefits of the plan are to be related to earnings). (2) Age. (3) Sex. (4) Seniority or past service (if the benefits of the plan are to be related to service.)

Employer Cooperation

Local unions should, in most cases, be able to get this data from the employer, who will probably have it readily available in his files. If, for any reason, this information cannot be obtained through the employer, the union can make up cards with blanks for the members to fill in with the data needed.

To figure out how much money must be in the pension fund when a worker reaches retirement age in order to guarantee his pension for life, the actuary makes an initial assumption as to how long the worker is likely to live after retirement. To guide him in making this assumption, he has at hand a mortality table which shows the average future life expectancy of an individual at all various ages.

One table in common use at the present time is the so-called 1937 Standard Annuity Mortality Table. According to one table, the average male at age 65 can expect to live 14.4 years longer. The average female at age 65 can expect to live 17.55 years longer.

Interest Cuts Cost

If the rate of pension for which a worker qualifies at age 65 is $1,000 per year, the fund must be large enough to provide him with a total of $14,400 in income from the time of retirement until his death, when the pension will cease. This does not mean, however, that the pension fund need contain this full amount at the time he reaches age 65.

As previously mentioned, the actual cost equals benefits paid *less interest.* A portion of the pension will be paid out of interest earned by the residual part of the fund during the period of his retirement.

If interest is earned at the rate of 2%, for example, then a fund of about $12,400 will be needed to pay a pension of $1,000 a year beginning at age 65. If the rate is 3%, the same job can be done with about $11,550.

[TO BE CONTINUED]

Cinerama Earns $6,500,000

Gross receipts of approximately $6,500,000 were earned by "This Is Cinerama" in the period between its opening in September '52 and January 1 of this year. The film, which is the first picture made for the Cinerama medium, is now playing in nine cities and was viewed by 3,500,000 before January 1.

Billion for Broadcasters

The broadcasting industry may achieve its first billion-dollar gross-income year in 1954, according to an announcement by the National Association of Radio and Television Broadcasters. Tv is expected to gross over $500,000,000 with radio running very close to it.

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Actually, a splice made with Ethyloid is stronger than the film itself.

Works fast in any climate, hot or cold. Will not congeal.

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HEADQUARTERS FOR FILM MAGAZINES

Give your Projectionist, Wenzel 25" Magazines. He can use that "Extra Changeover Time" for other Booth requirements.

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The Wenzel 25" Magazine is not a "made over" 18" magazine. It has been designed and engineered especially for the job it is required to do.

The Wenzel 25" Magazine, known as PRO-51 Upper, and PRO-52 Lower, are 3-1/8" deep, and when the beaded type door is closed, there is approximately 4" inside clear depth in the magazine.

Wenzel also has a Hand Rewind for 23" Reels, that is complete in itself, and can be used with a motor, if desired.

FILM MAGAZINES
18" Standard Type
18" De Luxe Type
25" All Purpose Type

Write for complete illustrated and descriptive literature, or ask your supply dealer.

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LARGE-CORED Lorraine ORLUX SUPER-CHARGED Carbons

For CINEMASCOPE

3-D, Drive-Ins, and other Wide Area Screens

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PROJECTION LENSES

(Continued from page 8)

flanged guide - rollers. Long - focus lenses tolerate these defects rather well, but short-focus lenses show them up as out-of-focus areas on the screen.

It is easy to see that projection lenses work under handicaps that are so variable that the lens-designer can do nothing about them. Also, a projection lens must have a large diameter to provide efficient illumination of the picture on the screen. A cameraman may sharpen the image-definition of his short-focus ('wide-angle') lenses by "stopping" them down to a smaller diameter and increasing the exposure-time by adjusting the shutter to compensate for the loss of light. The projectionist cannot do this because his shutter already works at maximum efficiency. And even if it were possible to speed up the action of the intermittent sprocket and to narrow the shutter blades, stopping down a projection lens increases the "vignetting effect" of optical mismatch between arc-mirror and projection lens.

Best None Too Good

No compromise of projection quality, and hence of lens quality, should be tolerated. New lenses of high quality are costly, and yet no theatre can afford lenses which are not the best. It would be a wonderful thing if the different lens manufacturers could pass "sample" lenses around to theatres where old, uncoated lenses are still used. Projectionists and exhibitors alike would be amazed at the difference.

In every case new lenses should be tested under actual working conditions in the theatres. The first part of the test should consist of a careful visual examination of a focus-target test film, preferably in loop form so it can be kept on the screen as long as desired. Center and edge areas of the chart should have very nearly the same focus, definition should be sharp and brilliant, and there should be no trace of haze surrounding bright areas. Plain black-and-white titles provide excellent test films for detecting haze.

With a new lens in one projector, an old lens in the other, and identical focus-test loops running in each, rapid changeovers will show up the differences in the two lenses. To eliminate the effects of accidental gate misadjustment in one of the projectors, the lenses should be interchanged and the test repeated.

"Control" Testing

The second part of the test involves projection of an entire show, first with the old lenses and then with the new ones. The edges and corners of the picture require close examination; but failure of the lenses to resolve these extreme areas may be due to mechanism defects. The projectionist should merely keep in mind the results obtained with the old lenses and judge the new lenses on this basis.

"Fast" lenses having speeds of F/1.9 or more were introduced in an attempt to obtain more light on the screen and greater uniformity of illumination. It is our own opinion that the new speeds are very desirable in focal lengths of 4 inches or greater, and introduce no serious operating difficulties on account of their slightly smaller depth of focus. In the case of lenses having focal lengths shorter than 4 inches, however, too great a speed, or lens-diameter, may make good focus impossible.

Now, the slower lenses (speeds of F/2.5 or F/3.0 are not necessarily "old-fashioned." Many of the pre-war lenses are outmoded simply because they are uncoated; but modern improvements in optical glass, lens-design, and coating methods benefit *all* projection lenses of recent manufacture, slow as well as fast. It is well known that the slower lenses are more fully corrected, and that they have a greater depth of focus. They give clearer, if less brilliant, pictures. The differences, however, are so slight as to be virtually non-existent in the longer focal lengths, and become really serious only in the extremely short-focus lenses required for large pictures at relatively short projection throws. The fast lenses, as we have said, make possible brighter and more uniformly lighted pictures.

[TO BE CONTINUED]

'Scope on Standard Film

A satisfactory method of optically reducing CinemaScope film to standard size has been developed at the West Coast laboratories of 20th Century-Fox, but in accordance with company policy, these standard prints will not be made available for exhibition.

The system developed by Fox provides a standard print framed in an aspect ratio of 1.75 to 1 which is said to hold picture area loss at side, top and bottom to a minimum Perfection of the method eliminates the need to actually photograph a standard version of CinemaScope pictures. Studios have been photographing CinemaScope in duplicate with both anamorphic and standard lenses. None of the standard prints have been released as yet but Warners is rumored to be planning simultaneous release of both types of print.

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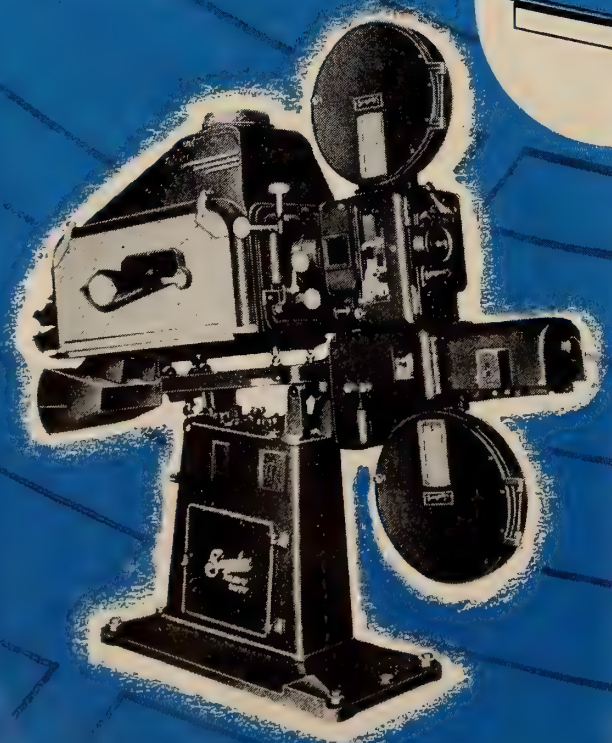
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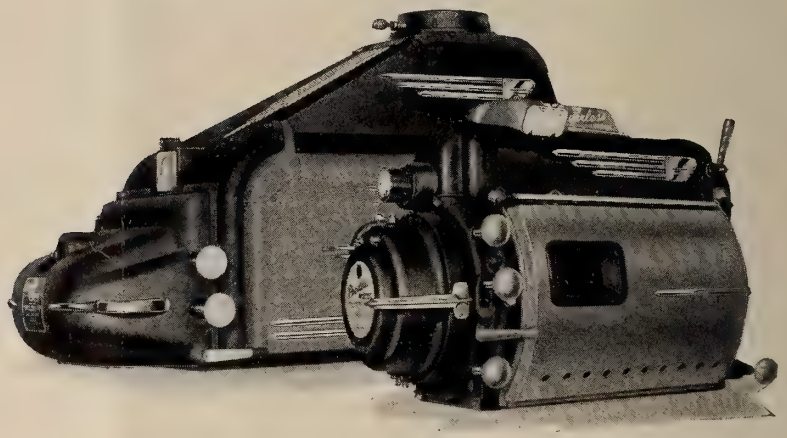
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MONTHLY CHAT

SOME years ago, an aviator called Corrigan flew across the Atlantic without official permission. Taken to task, he politely explained that he had no intention of spanning the ocean but he had made a "mistake" and flown in the wrong direction. And so, "wrong-way Corrigan" passed into history with a laugh.

But the "wrong-way movies" of the last few years are not so funny. Indeed they are tragic for the industry, the labor which has built it up, and the public which is served.

Did the industry adopt a single sensible aspect ratio (for example, 1.75 or 2.00 or even 2.25)?

Did it accept a reasonably sized and economical screen of easily installed and readily movable type?

Did it avoid off-beat lens systems?

Did it adopt the simplest and least costly sound systems which would do what was needed?

Did it keep projection-room jobs on a basis that could be handled by men with only two arms and two legs?

And in the 3-D field, did it work out correct 3-D camera methods and correct projection equipment and processes *in advance?*

Did it provide reasonable size reels and enough projectors to handle the job sensibly and without long and unpleasant intermissions?

Did it put good stories into 3-D? And did it furnish acceptable 3-D spectacles for the audience? Were the 3-D pictures on the screen bright enough?

Did the producers enthusiastically support 3-D with their *best directing*, acting, writing, and technical talent?

Did the enthusiastic audience reaction to the handful of, at least, fair 3-D pictures jar the producers into producing more and better 3-D pictures?

Were the problems of the studio, the box-office, and of Labor all sympathetically and intelligently considered?

To all these questions, the unfortunate answer is a resounding "No!" And, in addition, with story values again dropping in many instances, does the future look bright during this uncertain period? You can answer for yourself.

There never was so critical a time for "Corrigan of the Movies" to look soberly at his problems and intelligently, bravely, and continuously try to solve them. If he wishes to reach Hollywood, he should stop flying to Ireland.

[The foregoing is by way of being a preliminary to the inclusive article headed "Where Do We Go From Here?" beginning on page 7.]

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VOLUME XXIX MARCH 1954 NUMBER 3

Where Do We Go From Here?

The once-proud motion picture business which prided itself on its technological achievements is today faced with the fruits of its own timidity and indecision. Technical problems that could have been resolved with a minimum of expense and effort a few short years ago — with much face-saving in terms of public relations — constitute a major industry sickness. IP now reiterates this conclusion.

IT IS now March, 1954, and nearly a year has past since some seemingly harsh opinions on how the industry has handled the so-called new processes were expressed in an editorial in this magazine. In the intervening months there have been no epoch-making developments that would suggest a change in this outlook. We refer specifically to the following excerpt from a commentary which appeared in IP for May, 1953 (page 23).

> Here's how the "majors" stack up in terms of aspect ratio preferences (keeping in mind 20th Fox's 2.55 to 1 ratio):
>
> Paramount—1.66 to 1; RKO—1.70 to 1; Columbia—1.85 to 1; M-G-M and Warners—2 to 1. It will be noted that these figures are not too far apart, and it is likely that just a little giving and taking all around could achieve unanimity for a standard ratio. . . .
>
> IP holds that a projection system adopted by any theatre should have two basic characteristics: 1, it should fill the normal line of sight for a majority of the seats, and 2, it should be consistent with not ripping out a theatre's entrails by major structural changes.
>
> As for screen sizes for *all* types of pictures, IP's preference is as follows:
>
> Small Theatre: 30 x 18 ft.
> Medium Sized: 44 x 24
> Large Theatre: 50 x 38

It is obvious from the foregoing that there exists a basic conflict of ideas. Why?

The "why?" of this situation need never have ben posed by an industry that prided itself upon being the fifth largest in hte world if there had been even a modicum of common sense among those who have directed its destinies.

Witness how another (and, if you will, blood-brother) art solved one of its most complex problems. We quote now from the official figures on the RMA (Radio Manufacturers' Association) which portray graphically the effort expended to nourish a developing industry which for many years previous had not even paid its "keep." In the past 20 years the radio-Tv industry has expended for *developmental work* the following:

1. For black-and-white Tv $30,000,000
2. For color development 45,000,000
3. For supplementary color research 50,000,000
4. Cooperative study of the basic problems of color Tv, through the National Tv System Committee ... 10,000,000

Now, then, when did the responsible executives of the motion picture business ever hold a round-table conference for a discussion of general industry problems? If they met in private at Miami Beach or Palm Springs, were the conclusions stemming from such a meeting of the great minds made available to the industry from which they have for years drawn their sustenance?

IP has consistently advocated — nay, begged—for a meeting of minds among those whose livelihoods depend upon the successful conduct of an industry which depends for its life blood upon serving the public. The most unimpressive coffee house would not ignore such a challenge to its existence.

We quote from a recent (March 4) bulletin from the Theatre Owners of America, Inc. a statement attributed to President Walter E. Reade:

"Mr. Y. Frank Freeman . . . explained that when a picture is made by the new Vistavision camera and

projected by means of *conventional* prints in an aspect ratio of 1:85, there is a tremendous improvement in entertainment value. Mr, Freeman went on to state that while he did not criticize or knock any other aspect ratio, his company (Paramount) felt that the 1:85 ratio was the more efficient because *it had height as well as width.*

"We questioned Mr. Freeman concerning the use of stereophonic sound and we were told unequivocally that Paramount will not require the use of stereophonic sound under any conditions."

We quote now from an address by Herbert Barnett, president of the Society of Motion Picture and Television Engineers, before the recent meeting of the National Allied Drive-In Theatres Association:

Still Experimenting

"Some of the studios have indicated something less than satisfaction with the CinemaScope sound proposal. This is evidenced through their continued experimentation with other schemes. Some of these are apparent attempts to accomodate product to all theatres, whether equipped with stereo sound or not. Some indicate preference for optical recording over magnetic, and only the sponsors know what some of the others are trying to accomplish.

"One aspect of this we can all understand—confusion still reigns. It would be extremely narrow-minded to suggest that these experiments cease, for it is through such that progress is assured. In the present state of the art, however, it is urgent that these be kept in the laboratory until engineering and economic facts clearly establish the process as commercial in the accepted sense of being adaptable to all segments of exhibition. And there should be prior agreement, through give and take, on one system acceptable to all. This is almost too much to expect until you realize that a healthy industry demands it be so."

How can any major industry exist without standards?

Mr. Spyros Skouras states flatly that no CinemaScope production will be licensed for exhibition unless the 20th Century-Fox version be used. One question immediately suggests itself: Will the use of the special CinemaScope sound reproducing equipment insure the boxoffice success of a given production, and thereby justify the added expense involved?

IP's view is precisely the same today as it was a year ago (May 1953):

Really Good Pictures

"With all this fussing about new processes, visual and sound, let's not forget that a bad picture cannot be helped by them and a good picture cannot be hurt by their absence. We're mindful of the fact that a *good* old-fashioned 2-D picture, "Moulin Rouge", is now in its 14th week at the Capitol Theatre on Broadway, N. Y. City, and that over on 52nd St. another *good* 2-D picture "Lilli", still is knocking them dead around the clock daily at $1.50 a head.*

"We wish wistfully that the dozen or so men whose aggregate income as "leaders" of the motion picture industry runs to several millions annually, and who meet socially with the utmost cordiality in Hollywood, in Miami and New York, in Paris and Monte Carlo and in Rome — we wish these fellows would spend about $25 for a hotel suite some afternoon and, with the help of a few first-class technical minds, reach a degree of agreement which would put an end to all this insanity. It's simply incredible that they don't."

When the writer first saw CinemaScope he was doubtful of its commercial success, because the composition of the image (not ot mention the photographic quality) violated the basic fundamentals of artistic photographic framing. Still unanswered is the question of whether any artistic composition may be presented on a super-elongated framework. We in the motion picture industry, can no longer contest the comfortable immediacy of home Tv with "gimmicks."

We are tossed and pulled by a bewildering variety of suggestions which if subjected to two hours honest consideration by competent technicians would be dissolved as is the morning mist by the rays of the sun. But we are asked to digest the economically-unpalatable fare of the non-technical overlords and their technically-minded sycophants, who in the process of collecting their quite handsome weekly stipend, are throttling the exhibition end of the business.

In short, it is the old, old story of the tale wagging the dog. What, then, can be done to effect some degree of order out of this economic and technical chaos? Lest it be thought that IP projects its own particular brand of bias, we again quote Herbert Barnett, president of the SMPTE in his interesting speech to the confused operators of our nation's drive-in theatres.

Industry Stability

"I feel that stability could be accomplished only through a change in the operating pattern of the industry and that there was now great need for some kind of mechanism through which products of the present technical evolution could be sifted and impartially evaluated in the interests of all.

"Since the exhibitor is 'closest to the customer's requirements and preferences' he can best provide what the audience wants to see and he can do this with attention to the technical performance of his own equipment."

Varying aspect ratios? Curved screens? Stereophonic sound? Picture height and width? These and many other problems which confront the exhibition end of this industry, and on the solution of which depends the livelihoods of thousands of conscientious and hard-working people, are not insoluble. The chief executives of the major producing companies are but a telephone call removed from each other. Dealing in the communication of intelligence, as we in the motion picture industry most certainly do, this should be no difficult feat.

* Lilli is still playing at this theatre and is billed as the longest-run hit in New York.



Harvard O'Laughlin (right), business representative for Local 143, St. Louis, Mo., presents honorary membership card to Lester B. Isaac, director of exhibition for Stanley Warner Cinerama Corp.

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Simple "Degaussing" Procedure Protects Magnetic Tracks

Alertness is required in the projection room to prevent CinemaScope sound from picking up noise or being erased by stray magnetic fields.

By EDWARD STANKO

Manager, Engineering Section, Technical Products Service Division
RCA Service Co., Inc., Camden, N. J.

WITH the advent of sound recordings on magnetic tape, and particularly stereophonic sound on magnetic striped film, special precautions are necessary for handling magnetic film by recording engineers, film laboratories, studios and projectionists. Unless special precautions are taken, it is possible to erase the sound from the magnetic track, or to add extraneous noises and sounds which may ruin the sound on the tape or film. In many instances, proper "degaussing" of certain parts of the equipment may be necessary to avoid such damage.

The problem of degaussing is not new, nor is it difficult to degauss metal parts of a projector or soundhead. Nearly everyone is familiar with demagnetization or degaussing of a timepiece or watch. Watches that have become magnetized run erratically and will not keep accurate time. They must be degaussed before they can be adjusted and regulated to keep accurate time. This is done by passing the watch through an alternating current magnetic field.

Normally, the molecular structure of metals is arranged in a haphazard way and not much attention is given to their arrangement unless the materials are susceptible to magnetic fields and are used in electrical or electronic circuits, or must be arranged in some particular way for stress purposes.

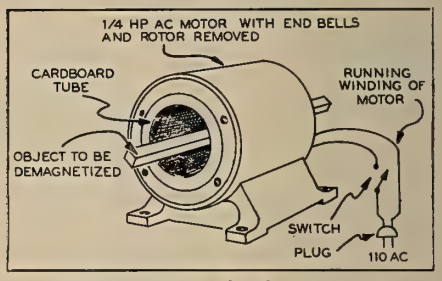
The recording of sound on magnetic tape or film is a process whereby the molecules of iron oxide are arranged in a pattern to conform to the magnetic flux produced by the recorder head in response to a signal from the pickup microphone through the amplifier system.

The varying magnetic flux of the recorder head leaves a semi-permanent residual magnetic field on the iron oxide of the sound track which can be converted to sound by running the tape or film over the reproducing head. The magnetic track can be made visible by the application of Visi-Mag* to the tape or film if the signal level to the recording head is high enough and the magnetic oxide molecules retain sufficient magnetism to orient the fine ferrous particles in the Visi-Mag.

Because the sound recorded on magnetic tape or film is accomplished by varying the frequency and amplitude of the magnetic flux of the recorder head, extraneous sound can be recorded on the magnetic tracks, or the sound on the tracks can be wiped off by stray fields produced by any electrical device that has an electro-magnetic field, or any object that has become magnetized, either purposely or inadvertently in the process of manufacture or use.

Electrical devices, which produce electromagnetic fields and used near film recording or reproducing equipment are: electric motors, transformers, arc lamp rectifiers, arc lamp generators, rewind motors, exciter lamp power supply units, soldering irons, etc.

Parts that may become magnetized and may be the cause of introducing extraneous noises on the magnetic sound track, or may be responsible for wiping the sound from the tracks are projector sprockets and sprocket shafts, soundhead sprockets and sprocket shafts, projector and soundhead pad rollers, pad roller shafts

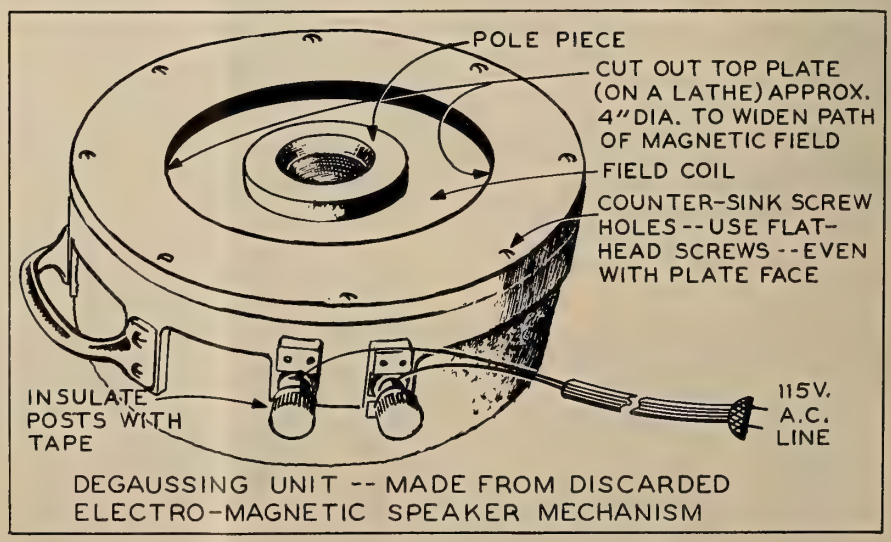


Degausser from old electric motor

and fire trap rollers. Projector gate shoes, particularly the pressure shoes mounted on the end of the pressure gate to apply pressure to the film on the intermittent sprocket, have also been frequent causes of wiping sound modulation from magnetic film.

In order to protect the recorded sound on magnetic sound tracks all metal parts that can become magnetized should be carefully checked with a small compass or gauss meter. Any part that has less than ten gauss will probably not affect the sound track. A small compass will give a relative indication of how much magnetism a part has by registering the amount of attraction or repulsion it exerts on the compass.

A very simple way to check a metal



* Obtainable from Magnecessories, Box 6960, Washington 20, D. C.

part is to use a ferrous stapling clip taken from a paper hand stapler. If the magnetized object will pick up an individual iron staple clip, it probably has more than ten gauss. If it does, the part should be degaussed. If it will not pick up a staple clip, the amount of magnetization is probably less than ten gauss and will have no effect on the recorded sound nor will it wipe any sound from the magnetic tracks.

In addition to magnetized projector and soundhead parts causing damage to the sound tracks, stray fields produced by rewind motors have been known to affect the sound track. Magnetic track films should be rewound either by hand or the motor placed in such position so that its field will not affect the sound track. Cutting of magnetic sound films with magnetized film splicers, or scissors, can also introduce noise on the sound track. All such devices should be degaussed before using on magnetic film.

Degaussing Tools

For degaussing metal parts, the most convenient tool is a Weller S-500, 250 watt gun-type soldering iron equipped with special coils. The following size coils are recommended.

Twelve turns of #6 wire wound into a coil 3½ inches in diameter. This coil can be used to degauss a complete projector gate and other large parts.

Twelve turns of #8 wire wound into a coil 2½ inches in diameter. This coil size can be used to degauss sprockets, sprocket shafts, pad rollers, fire trap rollers, etc.

Twelve turns of #14 wire wound into a coil ½ inch in diameter. This smaller diameter coil is used to degauss the magnetic reproducer pick up head. All coils should be made of round copper wire insulated with Formvar.

One small compass. This item is available in sizes from ½ inch to 1½ inches in diameter.

An excellent type of degausser can be made from a discarded ¼ horsepower AC motor. Remove both endbells of the motor. Insert a cardboard tube inside of the motor so that the metal parts to be degaussed do not contact the metal parts of the motor. This will prevent such parts as sprocket teeth from becoming damaged. Connect the motor running winding to a 110 volt AC power supply through a switch. A foot switch will be found to be very convenient when numerous parts have to be degaussed.

Similarly, an excellent degaussing unit can be made from a discarded electro-magnetic speaker mechanism. The voice coil and diaphragm are removed from the unit and discarded. The air-gap between the center polepiece and the inside periphery of the cover plate is enlarged to widen the magnetic field path. The field winding can be connected to a 110 volt AC circuit without rewinding as the impedance of the coil is higher than the DC resistance of the coil. The part to be degaussed is passed over the magnetic field while the field coil is connected to the AC power circuit.

Proper Procedure

After it has been determined that a part is magnetized by using a gauss meter, compass, or a staple clip, a coil of suitable diameter is slipped over the part and the coil connected to the soldering unit terminals. With AC power applied to the gun, pass the coil over the part and withdraw slowly to a distance of two feet before turning off power.

Do not turn off the AC power while the part is in the field of the coil. Always withdraw the object that is being degaussed slowly from the magnetic field. Degaussing should be continued for about 30 seconds for each part. After the part has been degaussed, it should be checked with a compass or staple clip to determine if there is any magnetism left. If there is, the procedure should be continued and, if possible, the part being degaussed should be rotated as the part may be magnetized in several directions, that is, vertically, horizontally or transverse.

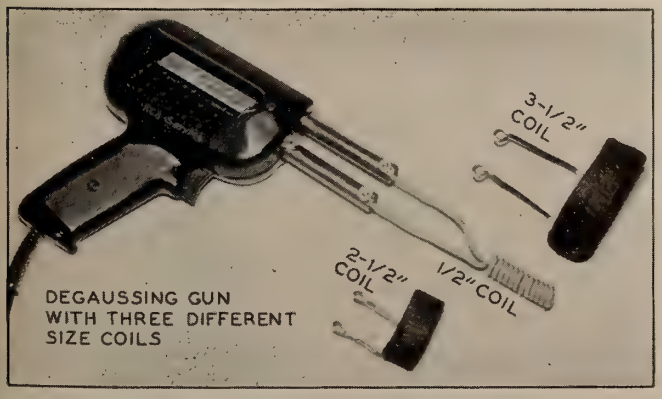
It is advisable that degaussing of projector and soundhead parts be done at periodic intervals. In some instances it has been necessary to degauss more than once weekly, depending on local conditions. It is suggested that each projection room be equipped with degaussing equipment so that new parts or parts subject to magnetism can be degaussed before serious damage occurs.

In checking the parts for magnetization, be sure the "metal attraction" for the compass needle is not mistaken for magnetization of the part. In some cases transverse or radial magnetization cannot be completely eliminated, and it is questionable if such magnetism would have any affect on the magnetic sound track.

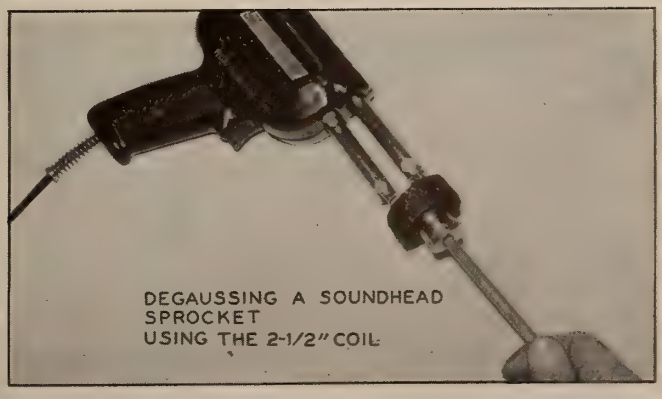
What "Degaussing" Means

"Degaussing" is another of those strange-looking words that are now being bandied about in projection circles. It simply means "demagnetizing" and is used in reference to various projector parts and other equipment which may generate magnetic fields. The word gauss is from the name of Karl F. Gauss, a German mathematician, and is a unit of measurement for the intensity of a magnetic field.

As explained in Mr. Stanko's article, when a magnetic field reaches 10 gauss, it is sufficiently powerful to injure magnetic sound tracks.



DEGAUSSING GUN WITH THREE DIFFERENT SIZE COILS


DEGAUSSING A SOUNDHEAD SPROCKET USING THE 2-1/2" COIL

THE LENS: Key to Projection Quality

The second in a series of three articles.

By ROBERT A. MITCHELL

THERE are major optical aberrations which tend to spoil the performance of lenses. Two of these are chromatic aberrations which introduce spurious colors around the edges of images. All good lenses are practically free from color aberrations, which are eliminated by using several kinds of optical glass of proper curvature in a single lens. Much more difficult to eliminate are several of the remaining five aberrations which affect the clarity of the image and the flatness of the field.

The lens designer cannot get rid of all of the aberrations entirely: he can only reduce them to the point where they are no longer bothersome. Several compromises have to be effected, and the most critical tests will reveal traces of several aberrations in even the finest lens.

Aberrations in Lenses

Spherical aberration prevents the formation of crisp images; *coma* is the most serious obstacle to sharp focus at the edges of the field, and *field-curvature* prevents a sharp focus at the center and edges of the field simultaneously.

The faster the lens and the shorter its focal length, the greater the difficulties which the seven aberrations present to the optical designer. Residual aberrations may prevent top picture quality. As a rule, flat-field, short-focus lenses result in images lacking "crispness" and brilliant contrasts. And yet, modern short-focus lenses are superior to old-style ones because the new optical glasses and anti-reflection coatings permit the designer to use six or eight instead of the usual four elements. This means that he can reduce the troublesome aberrations to lower levels than was formerly possible.

As already mentioned, short-focus lenses have very little depth of focus, especially if they be "fast." This is the nature of the beast and cannot be remedied. Strange as it may seem, even a *perfect* short-focus lens (if there were such a thing!) would reveal the focus-ruining effects of film-flutter and buckling which normally occurs under the influence of heat.

Safety Film Characteristics

Some of our focusing troubles may be blamed on the high-acetyl safety film in its present form. This type of acetate film is a bit too sensitive to heat to be really good for projection in theatres. True, it shrinks very little, and it does not get so brittle with repeated use as the old nitrate film did. But heat warps and deforms it and causes it to buckle and flutter in the gate much worse than nitrate film. We got clearer movies with nitrate film. The answer to this problem is the development of a tougher, more heat-resistant safety film.

We projectionists know that uneven gate tension and hollowed places worn in the steel film-runners adjacent to the aperture distort the film so that it fails to lie flat over the aperture. (Of course, film never lies *perfectly* flat over the aperture, but at least the position it assumes should be symmetrical to the lens.) If one corner of the film-photograph is bent away from the lens by only a few thousandths of an inch, for example, the corresponding corner of the projected picture will be a bit hazy — and no amount of focusing will clear it up!

This defect is easily corrected by installing new film-track runners and new gate-door tension pads, the only sure cure where just *one* corner of the picture stubbornly refuses to come into focus. The trouble can also affect more than one corner; and even one whole side of the picture, usually the right-hand side, may be slightly blurred.

Although the lens is rarely to blame for lack of clearness in just one corner or side of the picture, it is nevertheless a good idea to test the lens.

Lens Test Procedure

Loosen the lens-barrel clamp so that the entire lens can be rotated in the holder. Project a reel of pictures and rotate the lens barrel slowly, maintaining the sharpest possible focus all the time. If the blurred area moves around the screen, the lens is at fault, and should be replaced with a new one at once. But in all probability the offending area will stay in the same place. In this eventuality there is

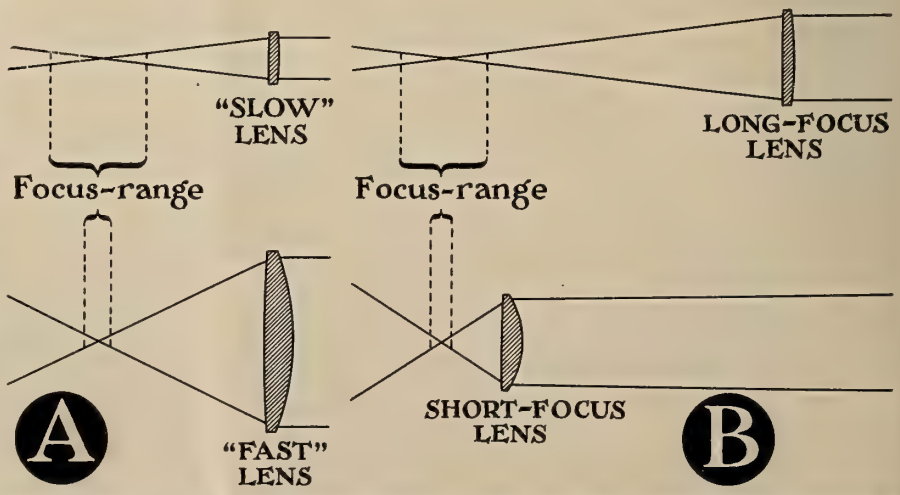


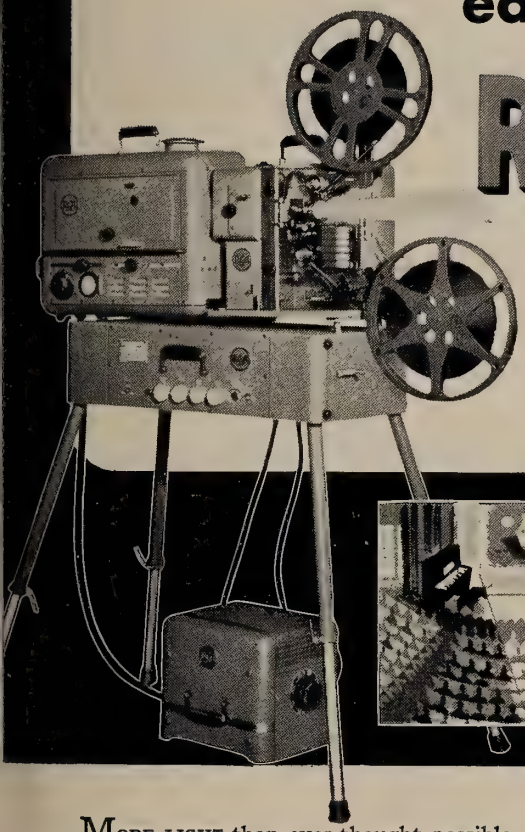
FIG. 1. Depth of focus. The sharpest image of a true point that a lens is able to produce is really a small disc — the smallest "circle of confusion." The size of this disc-image does not change appreciably when the lens or the film is moved within a short range called the depth of focus of the lens. As shown in (A), "slow" lenses have a greater depth of focus than "fast" lenses. And, as shown in (B), long-focus lenses have more depth of focus than short-focus lenses.

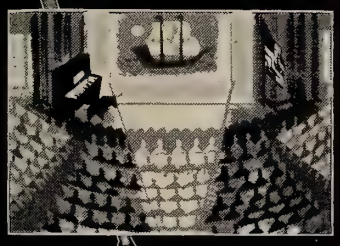
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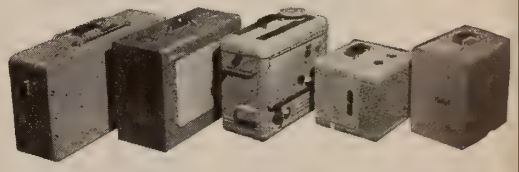
Industry, business and education can now show 16mm films at their best in company or school auditoriums...in tents at road shows, in fairs in rural areas, and to groups gathered outdoors.

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RCA's Porto-Arc Projector incorporates the superior professional features and top-quality workmanship of the famous "400" projector. These include dependable operation . . . "thread-easy" film path . . . the time-proved "400" mechanism.

This rugged and completely portable 16mm projector disassembles into 5 easy-to-carry cases. It can be set up or taken down in five minutes. The suitcase type projector stand has adjustable, non-slip legs and an elevating mechanism. It provides ample storage space for its legs, cable, carbons and other accessories.



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nothing to do but install new film runners and tension pads.

The flatness of the runners can be checked with a steel straight-edge *which is known to be accurate.* In order to see the hollows, a flashlight (preferably a "pen-light") is directed upon the casting *behind* the runners.

Remember, too, that an improperly adjusted guide roller can distort the path of the film, and that a guide-roller flange that presses too forcibly against the edge of the film will actually pinch the film and increase buckling in the gate. Excessive sideway of the picture usually accompanies this condition. The tension can be decreased by removing the coil spring and snipping a few turns from it with scissors before replacing it — a delicate operation that should not be attempted unless the film is actually seen to be buckling badly as it passes between the guide-roller flanges.

The operation of any projector is improved by keeping the guide-roller assembly free from dirt and very lightly oiled. Projectors having studio-guide rails in the gate — a poor feature from every point of view — require frequent examination and testing for wear and misalignment.

Right-Hand Edge Blur

Why is the right-hand edge of the projected picture usually blurrier than the left-hand edge?

When film is exposed to the heat of the arc pouring through the aperture, the photographic images absorb considerable heat. As a result, the emulsion normally expands more than the film-base, and each frame "pincushions" almost immediately, the bulge ordinarily facing the lamp ("negative buckling"). Since every frame has this shape during projection to the screen, the lens is focused *not* for a flat film but for a bulged film.

Now, the sound-track displaces the picture-area by about 1/10 inch. The bulging is rather gradual on the sound-track side of the picture (left on the screen) because this edge of the picture is 1/10 inch away from the gate-runner and tension pad which clamp the film flat in the gate. On the opposite side (right on the screen) the film is firmly clamped right up to the very edge of the picture-area. The bulging on this side is comparatively severe, and the distortion of the tiny photograph often exceeds the depth of focus of the lens. As a result, the right-hand side of the picture is blurrier than the left-hand side.

Because of the edge of the film-photograph on the sound-track side is 1/10 inch removed from the clamping action of the gate, this edge of the pincushioned photograph is a trifle farther away from the lens than is the opposite edge. It is just as though the film were slightly slanted in the gate. Each side of the picture consequently has a slightly different focus.

Most important, however, is the first effect — the actual *warping* of the firmly clamped edge opposite the sound-track edge. A distorted film cannot be focused sharply. With nitrate film this particular trouble was seen only very seldom; with safety film it has become a frequent nuisance. The use of short-focus lenses has also increased this defect of 35-mm projection.

Forms of Buckling

Short-focus lenses, especially if fast — and some are F/1.8 — exaggerate *every* distortion of the film in the aperture and *every* movement it may make under the impact of radiant heat.

While the pincushioning of the film-photographs is normally negative, as described above, extremely high arc currents may cause prints that have been projected 10 or 12 times to bulge out with the convex side of the frames toward the lens — reversed, or positive, buckle. This is due to progressive shrinkage of the emulsion.

Positive buckle makes good projection absolutely impossible. First, while a slightly concave frame gives a flatter field at the screen than a perfectly flat frame, a convex frame (bulging toward the lens) results in a concave field at the screen. The center or the edges of the picture may be brought into focus, but never both at the same time. Second, a positive buckle is mechanically unstable. The film may flop in and out of focus so violently that the entire picture looks blurry and fluttery. Projectionists who have operated in large drive-ins are very familiar with this trouble, and have fould by experience that nothing except heat filters in the arc beam will alleviate it.

Even normal negative buckle is greater at high arc amperages. And since the film undergoes bulging *while*

(Continued on page 31)

A Night Off From Tv?

Radio and the motion picture theatre became step-children simultaneously—according to the defeatist viewpoint. It would seem, however, that radio does not suffer from the mental circulatory disease prevalant in Hollywood.

By JACK GOULD

Radio-TV Editor, The New York Times

ON THE RADIO, station WNEW to be specific, there is a gentleman named Albert Collins who is performing a major public service. He is providing soothing, long-lasting relief from television.

Each weekday evening, from 9:30 to 11, Mr. Collins plays just about the best recorded jazz available and does it in a manner that bespeaks both singular taste and intelligence. If you want to study, read a book or tinker with a hobby, he can make a video-less evening seem slightly wonderful. . .

WNEW now has virtually a house rule that one way for radio to meet Tv's competition is to keep superfluous talk to a minimum. Mr. Collins obeys the rules. As a way of providing a framework for his show and establishing an entente with his audience he makes believe that he is operating from the moon, which enables him to look at earthly things with a bemused and detached eye. He does not overwork the gimmick, however, and most of his commentary is devoted to a word or two about the record to be played. He carries his knowledge lightly.

With television this programming philosophy is now more valid than ever. Turning on the radio should be a guarantee of relaxation. If it is, radio need have little fear of competing with jittery, frantic and loud video. Perhaps radio has overlooked its most appealing slogan: "A night off from television."



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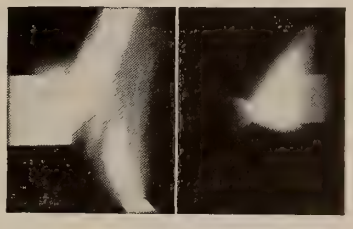
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World's Premiere Theatre Adopts "Flat" Screen For ALL Film Showings

This presentation by an acknowledge projection authority coincides with IP's views anent the proper presentation of motion pictures.

By CHARLES MULLER

Director of Projection, Radio City Music Hall, New York City

THE CINEMASCOPE projection system received what I consider to be its toughest test so far when MGM's "Knights of the Round Table" opened at New York's Radio City Music Hall with a picture 70 feet wide and 28 feet high. Despite special space considerations on our stage which necessitated using a flat screen instead of the customary curved type, we achieved excellent results with a few alterations in our standard projection equipment, plus a new RCA stereophonic sound system.

The Music Hall, with 6,020 seats, is unusual in that it is not only the largest but, so far as I know, the widest theatre in the world. Our projection throw is 185 feet at a 19-degree angle. In addition, a big drawing card here is our elaborate stage show with its highly complicated system of stage elevators. The stage show has to be considered when changes are made in our projection methods.

The necessity of conserving space in our stage fly lofts and clearing the stage of speakers as quickly as possible at the end of a picture were the primary reasons for using a flat rather than a curved screen. The maximum depth of the fly loft area available over the first stage entrance for flying the giant screen and also the center speaker of the stereophonic sound system is 50 inches. This speaker unit plus a 70-foot CinemaScope screen with the standard curve could not be fitted into the space available above the stage.

The way things worked out, relatively little change in our equipment was required in order to convert. It was not necessary, for instance, to obtain a new framework for the screen. The steel frame used for suspending our old screen is 110 feet long, 10 feet more than the full width of the half-circle stage proscenium. The effective working area within this arc for both screen and stage show is about 70 feet wide, the rest of width being masked by curtains on both sides. Our new Magnaglo-Astrolite screen is 70 feet long and 32 feet high, covering the entire length of the usable area.

Screen sizes and aspect ratio for pictures shown here during the past year varied considerably according to how well the picture was adapted to wide-screen projection with part of the top and bottom of the picture masked at the aperture plate. We experimented considerably and are still equipped to play any picture available.

Masking Is Automatic

We decrease screen size for the showing of newsreels and trailers by means of automatic masking of black velour curtains which move in over both sides of the screen, and which also can decrease the height of the screen. The electric system operating this masking can be regulated to provide almost any screen size or aspect ratio at the push of a button.

Except, of course, for the installation of stereophonic sound, few changes were made in our projection room equipment for CinemaScope and none are now contemplated. CinemaScope sprockets were installed and also new projection lenses in addition to the anamorphic attachments. We are, however, constantly checking the light on the screen, focus, and the amount of heat absorbed by projector and lamphouse parts to determine if additional cooling aids would be needed if we were, for instance, to consider raising the amperage in the lamps.

The present projection equipment includes Simplex projectors and Peer-

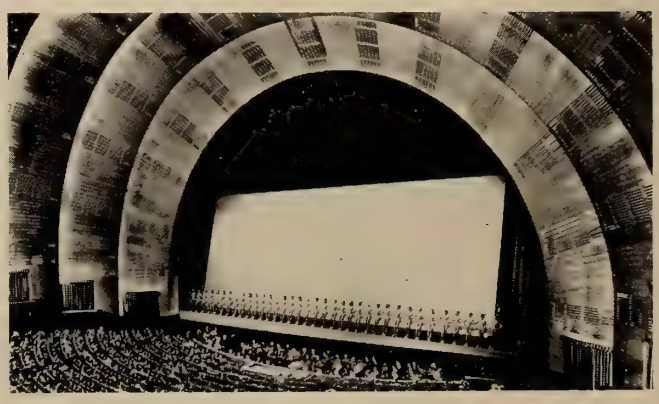
(Continued on page 30)

Curved- or Flat-Headed ?

In view of all the dogmatic statements made during the past year concerning curved screens and the added effect of "depth," better light distribution, *etc.*, supposed to be derived from their use, IP thinks that the story on this page about the Radio City Music Hall CinemaScope installation is very interesting.

The wide, flat screen installed there seemed to observers to give just as much feeling of depth as a curved screen with less distortion of the images on the screen. It was also felt that a flat screen distributed light better to all seats in the wide Music Hall auditorium.

It has always been IP's opinion that a curved screen is optically wrong, and that the new screen at the Music Hall reinforces our opinion. If, as insisted by pseudo projection geniuses, a curved screen is required for CinemaScope, why does the world's premiere theatre blandly switch to a flat surface?



Here is a view of new flat screen installation at the Radio City Music Hall in New York. Noteworthy is the fact that in the world's largest theatre CinemaScope productions are presented without benefit of a curved screen.

Polaroid-IP Contest Winner:

ARMANDO GONZALES
Kingsville, Texas, Member, IA Local 604

IN a contest that enlisted the cumulative experience of the organized projectionist craft, Armando Gon-Gonzales, member of Local 604, Corpus Christi, Texas, emerged the winner by the unanimous vote of a judging panel which included the following picture industry personnel: Dr. Lewis Chubb, Polaroid research physicist; Henry Kogel, staff engineer of the SMPTE; and the editorial staff of IP.

Lest it be suspected that Mr. Gonzales won "going-away," so to speak, we hasten to mention that he was subjected to the keenest of competition by the following IA members: Ray Brian, 722 W. Maywood Ave., Peoria, Ill., member of Local 434; Paul Cota, 829 Third St., Mason City, Iowa, Local 450; and Wilfred H. Spicer, 314 29th Street, W., Saskatoon, Sask., Canada, Local 347.

Focus, Brightness Check

The award to Mr. Gonzales was on the basis of simplicity of conception and execution. IP is particularly proud of the fact that among the hundreds of entries — be it from Maine, Florida, Oregon, or Texas — there are hidden away in projection ranks those craftsmen who are both working and *thinking* each day on the job to improve the process.

Both focus and the relative brightness of 3-D imagines on the screen can be checked by means of special polarized viewers available from Polaroid Corp., but it remained for Mr. Gonzales to develop a device which not only enables the projectionists to do *both* jobs at the *same time*, but also further simplifies the job of focusing the double images by enabling him to make a quick comparative test of both.

What Mr. Gonzales did and how he did it is clearly described in the diagram reproduced on this page,

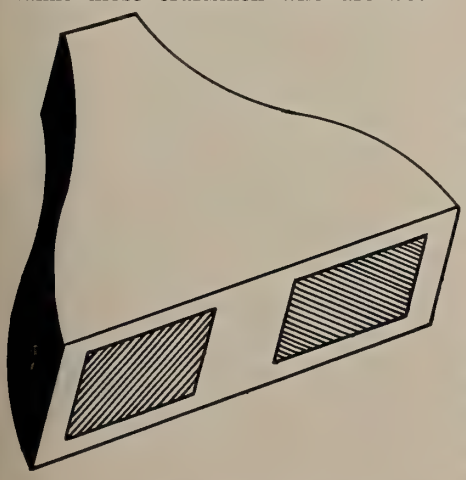


FIG. 1. Viewer used by Mr. Gonzales, details of which are diagrammed in Fig. 2.

Prize Winning Entry

Enclosed you will find drawings of a device that I made to help me with 3-D projection. What it does is this: I look through it with one eye, and I see the left and right picture at the same time side-by-side. With it I can check and see if the light from both lamps is the same brightness, and also check the focus a whole lot easier, because I see the two prints side-by-side.

ARMANDO GONZALES,
P. O. Box, 703, Kingsville, Tex.

submitted with his entry. It is not difficult to construct, and only easily-obtained materials are needed. Other projectionists may be interested in this time-saving aid and may want to construct one for themselves.

Basically, the Gonzales device puts the two stereo images side-by-side in front of one eye so that they may be compared for focus and relative brightness of each image. The path of each image as it enters the viewer and is then positioned by the mirrors for a one-eye view is clearly set forth in the accompanying diagram.

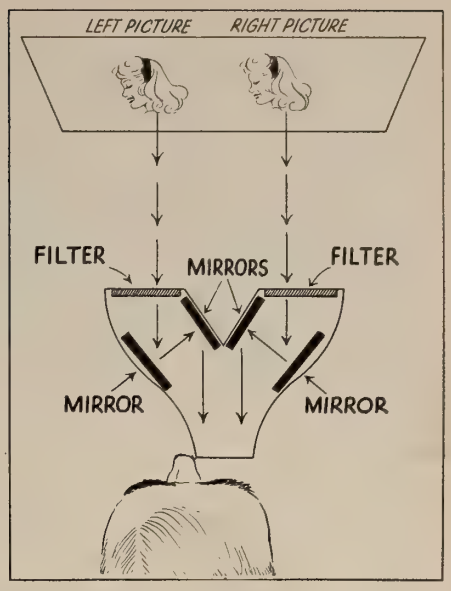
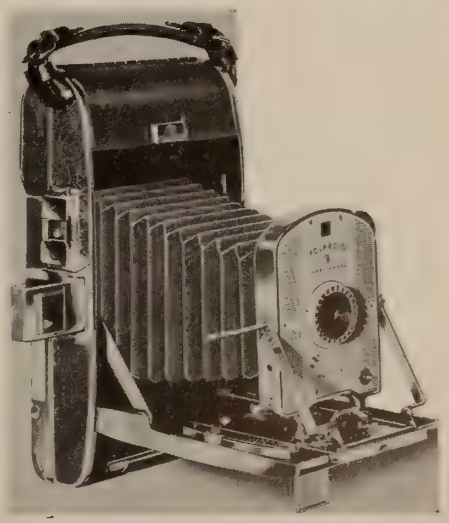


FIG. 2. Detailed diagram of images as seen through viewer shown in Fig. 1.

[*The Polaroid-Land Camera develops its own pictures in one minute and eliminates the need for waiting for prints to return from the laboratory. Snapshots can be passed around just a moment after the shutter clicks. One adjustment of the camera takes care of the shutter and lens settings, and all the photographer need do is snap the shutter, pull a paper tab, and the picture is ready. Prints are black-and-white, 3¼ by 4¼ inches. They can be enlarged or duplicated if desired, adapting the camera to business uses as well as pleasure.*]



Polaroid-Land Camera

IN THE

SPOTLIGHT

IN a reminiscent mood of late, we were struck by the fact that the entertainment field, craftwise, has now completed the full 360-degree cycle. At the turn of the last century stagehands were the dominant factor in the show world — with motion pictures being used as a "chaser." Then the projectionist was in the ascendancy, culminating in what seemed to be in the 1930's the near-extinction of the living stage and its stagehand practitioners. Sound pictures catapulted the projectionist, the cameraman, and every other practitioner of the audio visual art into prominence. Many and varied were the comments about stagehands being members of a "lost" profession.

But let's look at the entertainment field today. Visit any arena in which entertainment of whatever character is presented, and you are immediately aware of the fact that the stagehand *(IA parlance)* is the dominant factor in the production and execution of entertainment fare. This is not to say that the other branches of the organized craft don't contribute in full measure to their respective talents, but it is meant to point up the more or less dominance of the "stagehand" in the entertainment scheme of things as of 1954.

Now, we projectionists must face and answer the vital question as to whether the very tools that we utilized to make motion pictures the world's fifth-ranking industry are now being used with more telling effect by our brother workers in the entertainment vineyard.

• Dan Kelly, recently re-elected treasurer of Local 230, Denver, Colo., was signally honored in Masonic circles when he was advanced to the office of King in Royal Arch Chapter No. 30, and was made Generalissimo in Commandery No. 30, K. T. Another member of the Local, R. E. Waller, secretary, served in 1953 as Worshipful Master for Blue Lodge, Paul Revere 162.

• Each member of Local 330, Fort Worth, Texas, pledged 100% support to Fort Worth's United Fund by contributing one hour's pay each month during 1954. Local 330 is one of the many IA Locals throughout the country participating in organized Labor's efforts to push the Community Chest and United Community Fund drives for 1954 ahead of last year's figures.

In Memoriam
HARRY SHERMAN
March 3, 1952

• The Chicago Arena was recently purchased by CBS for conversion into a Tv center, which will give the Windy City a Tv center second in size only to the one in Hollywood. Three million dollars was involved in the deal — half for the purchase of the Arena and half for remodeling. Programming plans for the center have not yet been announced.

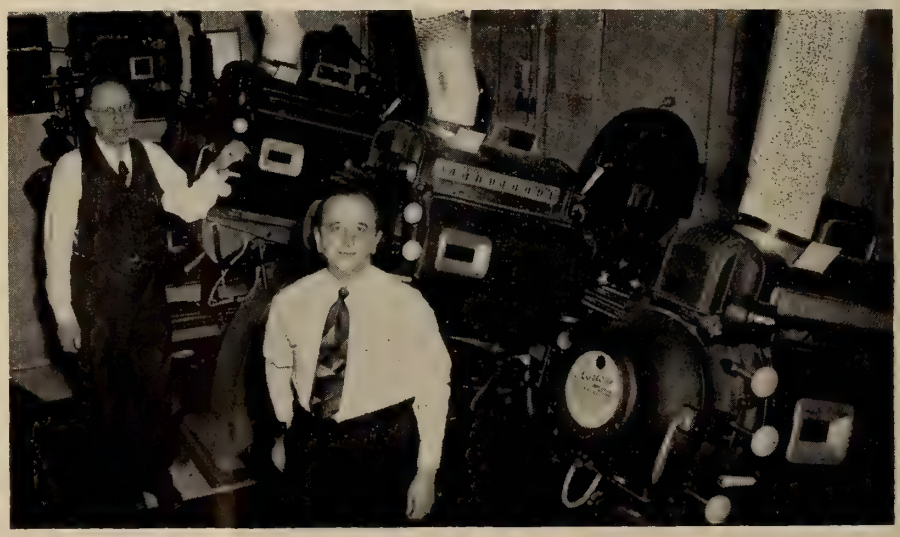
• Irving Merkur and Joe Clayton, prominent members of New York Local 306, were the featured speakers at the regular (March) meeting of the 25-30 Club. Production schedules prevented this department from giving a report of these most interesting discussions, the content of which will be reported in our next issue.

• The IA Executive Board held its regular semi-annual meeting at the Roosevelt Hotel, New Orleans, La., the week of March 15.

• In recognition of the rapid growth in recent years of the establishment of health and welfare funds covering union members, the AFL is compiling full information on such plans in handy pamphlet form to assist affiliated unions in the development of these programs.

• Nathan D. Golden, director of the Scientific, Motion Picture and Photographic Products Division, U. S. Department of Commerce, and honorary member of Cleveland Local 160, received the Department's Silver Medal Meritorious Service Award for outstanding accomplishment and service in the promotion of foreign and domestic trade for the motion picture and allied industries.

Nat Golden has represented the



Harmonious working relationship between fellow workers is exemplified in the projection teamwork at the Imperial Theatre in Toronto, one of the largest in Canada. Projectionists George Robinson, left, and Thomas Marsden, members of Toronto Local 173, have worked together on the same shift ever since the opening of this de luxe house 34 years ago.

United States government on many missions overseas on matters relating to the international trade of motion pictures. In 1945-46 he headed a mission to Germany for the Industrial Intelligence branch of the Joint Chiefs of Staff to secure the formulas of the "Agfa" color process, for which he was later rewarded with the Army's Certificate of Appreciation.

• A projection crew which has worked together for an accumulative total of 184 years may not be constituted an all-time record, but it would seem to warrant top billing in this department which is devoted mostly to personalities. The men who have compiled this enviable record of service to the industry are members of Local 219, Minneapolis, Minn., and are still in harness at the Radio City Theatre in Minneapolis. Their respective terms of service are as follows:

Horace Evans	36 years
Fred Berglund	38 years
Wood Smith	41 years
Pat McMurchie	30 years
Frank Rogers	39 years
	184 years

We think it eminently fitting to quote the exact words of Fred W. Berglund, chief projectionist at Radio City Theatre, and spokesman for the group:

"When sound first came in, there was the same mad scramble for equipment as there is now for 3-D and CinemaScope apparatus. Schools for instruction were held after the show at night and many dignitaries of national prominence in the audio-visual world addressed us. Despite this, needles *did* jump out of the groove; lips *did* move when they shouldn't; records *did* have cracks that didn't show on the surface; storage batteries did run dry and go dead, and 6-pole switches were forgotten, oh! so many times.

"Let's go back a decade or more to the days when it was against the law to have a motor-driven projector; when 1,000 feet was the limit on one reel; when the lamphouse was on tracks, to be pushed over to form a stereopticon; when illustrated songs were part of every de luxe performance.

"Finally, motors were permitted (that is, if the "operator" furnished them himself). I can recall one theatre I worked during these balmy ? days. It had a projection (?) room built out in the alley on the back end of a former grocery store. It was built on stilts and the floor sagged. A motor was mounted on the floor with a belt running up to a makeshift motor-drive attachment. When more "speed" was wanted, you shifted your weight closer to the motor, thus tightening the belt.

"What a long way this business of ours has come since then! Standard equipment formerly consisted of one machine and an AC compensarc. Here is what we now have at our theatre:

(a) 2 Simplex X-L projectors, equipped with RCA, Ashcraft lamps, Simplex penthouses and Selsyn motors

(b) 1 model 60 Brenkert projector with Peerlees Magnarc lamp (all three are equipped with 5000-ft Simplex magazines)

(c) 1 Stanch-Hoffman reproducer

(d) 1 Altec relay rack with 3 amplifiers and monitor

(e) 1 Altec A126A amplifier, plus two Western Electric No. 87 amplifiers in multiple

(f) 1 Sonex booth monitor

(g) 3 Altec E18 DC power supply units

(h) 1 Hard of hearing amplifier, wired to the back row of seats on the main floor

(i) 1 transfer panel to supply voice to a separate public address system when the regular horns have been raised for stage presentations

(j) 1 microphone control panel for p. a. system.

(k) 1 double-deck Chicago slide projector

(l) 1 double-deck Brenkert effect machine

(m) 2 300-amp motor generators, lo-



On behalf of New York Local 306, Charles Vencill (third from extreme right, secretary of Los Angeles Local 150, presented honorary retirements cards to Local 306 members (front center) Harry Reichline, Dave Narcey, and Marcus Pattiner. The presentation was made in the executivetive board meeting of the L. A. Local and was witnessed by the following board members (left to right) George O'Brien; Wallace G. Crowley, president; Hugh C. Smith; Clyde W. Shuey, business representative; Harold Angel; Vencill; Clem Marchand, and Albert R. Adams.



Projection staff at Radio City Theatre, Minneapolis, Minn., members of Local 219, who have compiled a total of 184 years of service working as a team. Reading from left to right: W. H. Smith, Frank S. Rogers, Fred W. Berglund (chief), Horace J. Evans, and Pat McMurchie.

cated in the basement engine room, with remote controls in the projection room.

(n) 1 Paramount intermediary Tv system. This is located in a room by itself, adjacent to the projection room and connected to it by a doorway. A metal film chute goes from the Tv dryer, through a wall and directly to one of the projectors.

(o) 1 Huff Hydro carbon cooling system for the positive jaws on the Ashcraft lamps

(p) 1 Spencer air-cooling system. This is piped directly to the aperture plates on the two CinemaScope projectors. The blower is mounted on the ceiling above the projectors. The compressor is located in another rom adjacent to the Tv room.

"In addition, we have lamphouse and projection room suction fans, as well as the regular house ventilating system. Quite an array of stuff, as compared with the old days.

"We have two screens — one is a Walker Silver screen on which we show a 33-ft. picture. The other is a Miracle Mirror CinemaScope screen on which we show a 25 x 60 ft. picture. We use approximately 95 amps on a 10-mm positive carbon, and our throw is 164 ft. for the regular picture, and the CinemaScope sheet is 10 ft. back of that.

Manifold Talents

"We could go on and on with these reminiscenses, much of which probably would be considered trivia. However, we would be remiss in our duty were we to overlook mentioning that one of our members, Frank Rogers, is the possessor of a very special talent. He is an artist of ability and he has produced some very beautiful effects which have been used as a part of our regular productions. Incidentally, he is the designer of the cover page on the IA Convention program used at the 1952 Convention held in this city."

• The 25-30 Club (New York) meeting scheduled for June 19 next will be the occasion for the presentation of honorary membership awards to Paul Reiss, supervisor of carbon arc sales for National Carbon Company, and Charles F. Horstman, supervisor in charge of sound and maintenance for RKO Theatres. This special meeting will be held at the Grand Street Boys' Clubhouse in New York City, and is expected to be a gala affair.





The old, or "museum", corner of the Malkames collection

Unique Cinematic Collection

IP is proud to present the chronicle of Don Malkames (charter member of Cameramen's Local 644, New York City, and also a licensed projectionist in Yonkers, N. Y.), who has one of the finest private collections of cinematic lore extant.

This the story of an extraordinary fellow whose counterparts look back on the early years of motion pictures with more than affection and nostalgia. They are anxious that the film, equipment and memorabilia of the movies' turbulent youth be saved from almost certain destruction.

One of the outstanding private collectors of these historic mementos, Don Malkames of Tuckahoe, N. Y., is a top-flight motion picture cameraman, and personifies, perhaps, the ultimate in devotion to this unusual calling.

Mr. Malkames revealed that he had fallen victim to the movie virus at the age of five when he was given a toy "magic lantern," and was a lost soul at the age of 17 when he promoted himself a professional projector and some vintage numbers like "Life of Our Saviour" and "Last Days of Pompei." After running a traveling show he convinced his father that he deserved a chance to make his way in the film world rather than go to college. The West Coast, with the then booming film industry, was his next stop.

Malkames returned to the East Coast in the early 30's, and in 1938 he began his film and equipment collection which today is one of the most outstanding in private hands.

Exemplary Housekeeping

One section of his spotless basement is devoted to a combination film workshop and display area for his equipment collection. A wall contains neat rows of projectors, each a milestone in cinematic history.

One niche contains an Enterprise dissolving stereopticon, an early attempt to make projected pictures move. In the 1897 section can be seen a Selig "Polyscope," a "Jenkins "Phantoscope," and a Colt "Criteriascope." A Gaumont "Demeny" projector of 1898, gleaming with its brass polished, sits on a nearby shelf.

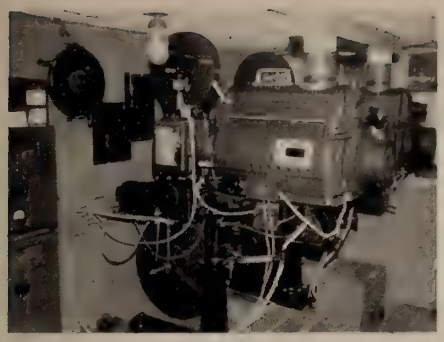
Advances In Art Shown

The improvement of equipment can be seen in a Powers "Cameragraph," of 1904, a 1900 "Motiograph," and a 1910 Edison "Kinetoscope," one of several of the famous "Kinetoscopes" of various periods which he owns. Cameras of all ages stand about the room. One, well preserved and of obvious age, has a possible distinction.

"I'm reasonably certain it's the camera D. W. Griffith filmed 'Birth of a Nation' with," Malkames stated, stroking it paternally. "And this," he continued, moving to a projector hoary with years, "is where the term 'limelight' came from." Opening it he pointed out the stick of lime which when heated, turned incandescent, producing an intense white light.

Personal Preferences

Malkames prefers to collect films which are *unusual* rather than just *old*. An example would be the hand-colored trick film by George Meilies of 1904, or "The Bold Bank Robbery" (Lubin, 1903), which was a bold copy of "The Great Train Rob-



Malkames' Modern Installation

bery," of which he owns an *original* Edison print.

In his beautifully-appointed miniature theatre with dual projection setup, he can run off films from his collection of more than 350 of historical value. Lumiere's "Arrival of a Train," Griffith's "Battle of Elderbush Gulch," or Edison's 21-mm-wide "The Wicked Elf," can be screened with ease, sometimes on the original equipment.

One projection room is equipped for 21-mm films which were developed from 1907 to 1910 by Thomas Edison for home showings. Malkames has examples of this interesting variant still in their original containers.

The number of theatre fires in France in the early part of the century prompted the development there of 28-mm devices for showing fireproof acetate film. Laws were passed forbidding the use of nitrate film on 28-mm machines, and France and Germany produced acetate films in goodly numbers. Production began to cease around 1922; but Malkames possesses good specimens and frequently screens them.

Films of this early era are not exclusively shown in Malkames' little theatre, for he has installed modern 35-mm equipment. It would not be unusual for "Policeman's Love Affair," (Lubin, 1903) to be followed by the latest wide-screen or 3-D production.



Museum's Miniature Theatre

Pension Protection—Goal of Labor

The relationship between Social Security benefits and private pension plans is very important. This is the sixth and final article in a series on pensions which reflect the official view of the AFL.

VI

BENEFIT schedules of some pension plans have been constructed in such a way as to make certain allowances for benefits available under the Federal Old Age and Survivors' Insurance program, commonly known as Social Security. Generally speaking, this has been done in one of two ways: either through the use of an "integrated" formula; or through a so-called "offset" formula.

An integrated formula is one which, in relating benefits to earnings, provides a higher percentage benefit on that portion of earnings which is in excess of the Social Security cut-off level (formerly $3,000, now $3,600 under the 1950 amendments) than it does on the portion below that level.

For instance, the plan might contain a formula which calls for a benefit of 1% of earnings of up to $3,600 a year, plus 2% of all earnings in excess of $3,600, for each year of service from entrance until 65.

Formulas of this type are used as a means of providing higher-paid employees with a larger pension than would otherwise be possible under Internal Revenue regulations. These regulations provide that no employee can receive a greater pension in proportion to his earnings than any lower paid employee, assuming identical periods of service and taking S. S. into account. Otherwise, employer contributions to the plan will not be tax exempt.

The "Offset" Formula

Some plans take account of S. S. benefits through the use of a so-called automatic "offset" formula, wherein the benefit schedule of the plan is stated as a certain amount or percentage *inclusive* of the primary S. S. benefit. In other words, the employer promises to pay only the *difference between* what the worker gets in primary benefits and the amount the formula sets forth.

Unlike the "integrated" plans described above, "offset" plans are designed to compensate automatically for future changes in S. S. rather than just to take account of the existing level of S. S. benefits. Any improvement in OASI benefits, regardless of whether or not employer contributions to OASI are increased, will, with the offset device, reduce the amount of benefits payable under the plan, and the employer's cost will drop accordingly.

"Offset" Disadvantages

The level of benefits available through S. S. will, of course, always have an implicit bearing upon the level of benefits which a union might desire to provide through a private negotiated plan, even though S. S. is not referred to in the terms of the plan. Obviously, a private pension of, say, $80 a month would be much less satisfactory to a union group if there were no underlying structure of S. S. benefits to which it might be added.

Also, inasmuch as the negotiation of a pension plan involves the segregation of a sum of money which could otherwise have been used for a cash wage increase, an increase in S. S. benefits may make it less desirable to sacrifice a future wage increase in order to add further to the level of private pension benefits.

Nevertheless, to express this relationship in the form of an automatic offset gimmick in the benefit formula is a very questionable practice. In the first place, it implies acceptance of the proposition that the level of combined benefits set forth in the plan is so nearly adequate that any increase in S. S. during the term of the agreement can be spared by the workers so as to be used to cut the employer's costs rather than to provide a higher level of benefits. Few plans now provide benefits high enough to justify this proposition.

Employer Support Lacking

Third, the argument, advanced by some, that such provisions would induce employers to lend their support to, or cease to oppose, necessary improvements in the S. S. system has not been borne out by the facts, and is not likely to be.

Over the long run, the cost to the employer of a certain level of pensions, provided through a private plan which makes no provision for vesting* — and which is loaded with so many maximum limits and restrictions on eligibility,

* The word "vesting" refers to a complete and consumated right which cannot be taken away.

(Continued on page 29)

"Omnisphere" — the *True* Total Cinema?

In line with its long-established policy of providing a forum for anybody having anything interesting to say about the projection process, IP herewith presents one point of view anent the "total" cinema, supplemented by its own views thereon.

By JOZEF COHEN
University of Illinois, Urbana, Ill.

THE *TOTAL* cinema made its modern debut in the form of Cinerama, utilizing three synchronized projectors and about 146 degrees of projection arc. Here was demonstrated conclusively the importance of the peripheral vision in achieving the enormous enveloping effect which transports the audience outside of the theater.

The total cinema is very old, and was considered almost as soon as motion pictures were developed. Even before, still projection in 360°, using multiple projectors, was demonstrated in the United States by the Chase Electric Cyclorama Co. of Chicago in 1899. In 1900, Grimoin-Sanson placed ten synchronized cameras in the basket of a balloon and drifted over Paris, recording the first panoramic motion pictures. Later the film was shown by ten synchronized projectors in a complete circle. The theater was at the Paris Exposition of 1900, and was called, as you might expect, Cineorama.

The "Moussard" Principle

During the last half century there have been many attempts to develop cameras and projectors for pictures on a wide, curved screen. Almost all of these are based on the so-called principle of Moussard, which is the same as that incorporated in "still" panoramic cameras which photograph high school graduation classes.

In the 1930's, Eastman Kodak Co. perfected the Widescope camera on the same principle; Fred Waller, the developer of Cinerama, has many patents on similar cameras. Because it is inherent in the principle that the lens shall rotate on its rear node, cameras of this type are impractical, for only one very narrow segment of the picture can be projected at any one time. Waller finally adopted three projectors, and we know the result as Cinerama.

Although the enveloping principle was properly demonstrated in Cinerama, the three projectors do not synchronize, the color temperatures* of the three projection lamps are not equal, and the three portions of the screen are therefore clearly distinguishable. Also, it was my experience that the enveloping effect could be broken if the head is shifted to take in even a portion of the outside periphery.

To counter-effect these difficulties, American Optical Co. (Dr. Brian O'Brien and Dr. Robert E. Hopkins) has designed a new system, called Todd-AO, which I understand utilizes 65-mm film and a wide-angle lens of about 140° of projection arc. This film size is undesirable, since it necessitates the forming of new processing machinery, and also the picture should at least be capable of coming out farther around the audience.

I believe that the problem of projection of motion pictures on a circular screen can be accomplished for any projection arc, up to 360°, using only one projector, 35-mm film, and several ordinary stock lenses. This camera and projector are the subject of a patent application, and although a disclosure cannot be made here, the patent application is available to proper and responsible people.

Projection "Dreamboat"

This system, which I have called "Omnisphere," will take and project motion pictures of the width of Cinerama, or a complete half circle, or even a full circle, if anyone would want it.

I cannot emphasize too strongly that there is exhibited not the slightest spherical aberation, and that the definition of the picture so produced is equal to or better than that found in ordinary theater projection. Further, the nature of the optical system permits the most efficient use of the light source, so that the brilliance of the image is equal to or better than ordinary theater projection.

"Omnisphere" projects pictures in motion simultaneously in 180°.

*Those who wish to pursue this matter of color temperature in greater detail, are referred to the article "Color Temperature: Origin and Meaning," by F. T. Bowditch, IP for November, 1947, p. 5.

IP Eyes "Omnisphere"

WE HAVE checked the history given in the opening paragraphs of Professor Cohen's leter. But this, after all, is not particularly important. We certainly do not agree with his statement that the Cinerama projectors do not synchronize and that the color temperatures of the three lamps are not equal.

Most certainly the projectors *do* synchronize, to the best of our understanding. And there is no special reason why the color temperatures of the three arcs should be noticeably different, nor even that the three prints which are synchronously projected should not be identical in color, if careful processing is carried out.

"Invisible" Joins?

We agree with Professor Cohen, however, that the joints between the center picture and the side pictures are visible, despite the action of the so-called "gigolo". We rather doubt that these joints can be made invisible in any practical and economic system using multiple films simultaneously.

We are not in agreement with Professor Cohen as to the enveloping effect. There is only a relatively small portion of the house in Cinerama where one is completely "enveloped" by the picture. From the sides and back of the orchestra, and from the balconies, there is certainly no enveloping effect.

As to the Todd-AO process, we do not regard this as being a member of the "Cinerama family". It is more closely related to CinemaScope, but differs in using a larger film and there-

fore producing sharper and less grainy pictures. It is not known how far the public will respond to such an improvement in picture quality. In *de luxe* houses such a system might be advantageous even though costly.

Large-Area Light Dispersion

In closing stages of his description, Professor Cohen speaks of using several conventional lenses on one projector with 35-mm film and a single projection arc to produce 360-degree pictures! We can only observe that this is a good trick if Professor Cohen can bring it off—particularly if he can spread the light of the arc through an optical system and several lenses over five or ten times the conventional area and still have just as bright a picture. We shall remain on the sidelines relative to this claim until it is more fully explained and a conclusive demonstration is given.

Humans' Field of View

As to the value of 180-degree pictures, psychologically this might even be undesirable. The field of view of the eyes is limited: people do not like to keep turning their heads all the time; and action splattered over large horizontal angles and areas may be distracting rather than dramatic. This, however, is conjectural. And the answer must await, at the very least, experimental proof.

New Products for the Industry

ALL-PURPOSE RCA PLASTIC SCREEN. A new vinyl plastic, aluminum pigmented all-purpose screen adaptable to standard "flat," wide-screen and 3-D projection has been marketed by RCA. Called the Dyna-Lite Silver Screen, it is made of a special formula vinyl plastic which is flameproof, tearproof and highly moisture resistant. A special metallic coating applied after the screen is fabricated assures a uniform reflection surface for 3-D. Another feature is its imperceptable seams, it was said. The seams are sealed by means of electronic equipment which leaves the entire seam area smooth, flat and in the same plane as the rest of the screen surface. Also, the entire surface of the screen is aluminized, including the seams. The screen is available in sizes up to 30 feet by 60 feet, either perforated or unperforated, the later being recommended for 16-mm.

BEST'S PORTHOLE FIRE SHUTTERS. A new line of porthole fire shutters, designed to meet all state and city inspection laws for projection room operation in theatres, schools, churches and all types of auditoriums, is announced by Best Devices Co., Inc., 10921 Briggs Road, Cleveland. Four distinct types of shutter are available in standard sizes or on special order for picture ports, picture and stereopticon ports, observation ports, and spotlight ports.

Each shutter consists of a welded steel frame to hold a ¼-inch steel drop-plate and glass. Simultaneous closing of all Best shutters in a projection room may be accomplished by a semi-automatic red-brass control bar.



Best's porthole fire shutters mounted in a projection room.

AMPEX TAPE RECORDER REEL. A new 1200-foot reel, using the standard National Association of Radio and Television Broadcasters hub to eliminate tape stretch, breakage, and pitch changes as the tape approaches the end of the reel, has been announced by Ampex. The new 8-inch, all-metal reel can be used on any machine which makes the NARTB hub. Until now, the critical recordist has had to use a 10½-inch reel, regardless of the length of the tape, to avoid the effects caused by the extreme tension of the tape near the end of a small reel.

REEVES LIFETIME MAGNETIC TAPE. A magnetic tape guaranteed never to break or curl when used under normal conditions of recording or playback has been announced by Reeves Soundcraft Corp., New York. It is claimed that the tape owes its permanent qualities to a newly developed magnetic coating and to a base of Du Pont "Mylar" polyester film. Break-strength of the new base is said to be 2½ times as great as standard cellulose acetate base tape.

NEW DUAL REWIND. Developed and marketed by Carroll Hathorn, projectionist at the Victory Theatre, Dayton, Ohio, is a new dual rewind machine designed to accommodate reels from trailer size up to 5,000 feet, taking two reels simultaneously. The rewind is especially valuable in synchronizing 3-D or stereophonic reels when patching.

By Way of Definition

Color temperature is that degree of luminescene produced by a specific light-emitting source (carbon arc, tungsten, etc.) which, in turn, is based upon *(a)* the nature of the light source and *(b)* the degree to which it is heated.

The color range extends from a dull red to a blue-white, and is subject to minute variations which are dependent upon the degree of care expended upon the operation of a particular equipment (s). Especially is this true when two motion picture projectors are used and the *instantaneous* changeover from one mechanism to the other is employed.

Everyday Examples of Color Temperature

The glowing coals of a furnace, the heater element of an electric toaster and the filament of an incandescent lamp are everyday examples of luminous substances that have a color related to their temperature. When these substances become hotter and hotter, their color progresses from a dull red at low temperatures to a brilliant white at higher temperatures.

Scientists have learned to use this characteristic of heated substances to set up an exact scale with which light may be compared and exactly described. For example, the similarity between the light of the sun and that of a high-intensity arc can be demonstrated by the fact that they have approximately the same color temperature.

What's Your Problem?

Projectionists whose problems appear below will each receive a $5.00 check from IP. We'd like to know "what's YOUR problem?"

QUESTION: Perhaps you can help me settle a problem which I have had for the past five years. I am troubled with a downdraft in each lamphouse. This is bad during the winter months, but it really gets troublesome when the attic fans are in use in the theatre auditorium. These fans exhaust from openings directly over the balcony and into the attic.

In the past, I was able to stand the "smog" in the projection room because I used the 1 kw. lamps, but recently I installed Brenkert Enarcs using a larger trim and more amperage. Now I have to leave the projection room when these attic fans are in use. I clean my lenses, and within two hours they are completely covered with a blue-white soot.

The lamp stacks are attached to 6-inch ducts which are directly over each lamp and run up through the attic to the roof and extend about 2½ feet above the roof. Just above each lamp I have installed the Strong backdraft section of pipe (grilled pipe with the cone in it). This seems to have no effect on the draft.

Also, in the center of the projection room is a 20-inch open-air duct opening onto the roof. Although I suggested to the manager of my theatre that a 3-speed fan be installed in this duct, and that the two lamps ducts be joined to the large (20-inch) air duct, nothing has been done about it. You probably know how theatre exhibitors are — they will pay $150 to have new shelves built for the concession stand but balk at spending an extra dime on the projection room.

LAWRENCE JOHNSON
Aggie Theatre, Stillwater, Okla.

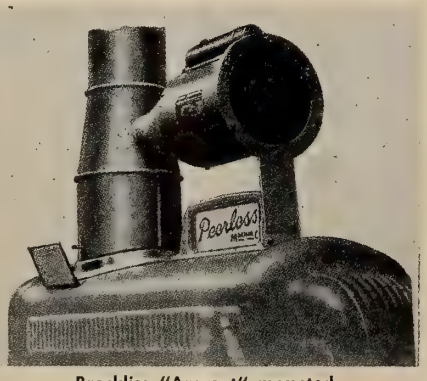
ANSWER: The suggestion you make in the last paragraph of your letter leads us to think you have hit on the best method of solving your problem. The downdraft you complain of is most serious in the summer when the attic fans are in use, leading us to suspect that there is a year-'round situation whereby air is sucked from your projection room by the theatre's ventilating system, tending to cause a partial vacuum in your projection room that sucks air down through the ducts.

Although the degree of downdraft varies from winter to summer, and there is no way for us to gauge its pressure, it is probable that if the two ducts were connected to the larger open-air duct that you describe, and a motor-driven fan installed, there would be no more downdraft.

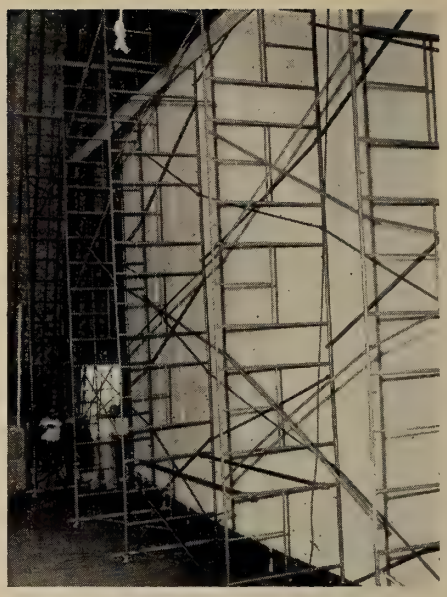
Something else to check on, however, is the present location of your exterior exhaust stacks or ducts. It has often been found that prevailing winds, if of great enough velocity and blowing in the direction of the exterior lamp exhaust stack, can form an impasse for the exhausted gasses, creating a backdraft and bringing the fumes back into the projection room.

The British have contrived a rather ingenious device for exhausting projection room fumes that has the added advantage of resisting backdrafts. The device, known as the Arvcent, is described as follows by an English projection expert:

The principle involved is that the ventilating system is manufactured as a unit to be mounted on the top of each projection lamp; the fan unit, of the turbine design, draws the air across the motor unit itself and directs the stream of air into a jet unit under pressure. The jet unit blows the air into the main exhaust chimney at great force so as to cause a vacuum behind, which induces the fumes from the arc in a controlled exhaust movement. Therefore, it is certain that the objectionable fumes which deposit themselves on the lamphouse parts and mirror generally are, by the new system of ventilation, induced by controlled draft to the open air.



Brockliss "Arcvent" mounted


Steel scaffolding, made up of lightweight tubular steel frames and cross braces is shown supporting a large CinemaScope screen at the Grove Theatre in Freeport, N. Y. It rigidly maintains a predetermined curve on a 24- by 64-foot screen. The steel framework, manufactured by Safeway Steel Products, Inc., Milwaukee, Wis., is similar to that sold for light construction work to the building trades.

Wind Direction, Velocity Immaterial

It follows naturally, also, that prevailing winds at the outside of the theatre do not interfere with this ventilation, due to the force of the jet unit in operation. It necessarily follows, also, that the Arcvent does give controlled ventilation irrespective of weather conditions and high efficiency concerning the burning of the arc, which is undisturbed by any exterior elements.

In addition, the fan unit also (which should be left running all day whether the projection lamp is burning or not), ventilates the projection room and in the case of an accidental fire would disperse the fumes quickly from the projection room, since the fan unit is situated near the film mechanism; also, the unit being left in operation all day cools the working parts of the lamp when not in use. Thus the projection lamp parts are ready for handling without any undue heat due to the extra cooling which is induced by the system.

A Projection Room "Must"

We found that mirrors are kept very much cleaner and do not require the usual wiping. Altogether, this unit invention is being received by all projectionists as a very useful asset to their working conditions. We are enclosing a copy of a letter received from a projectionist who is very impressed with the capabilities and performance of this apparatus. We should also mention that we have received a further letter from a second projectionist which points out that the Arcvent unit should be installed in all

projection rooms, as expense incurred for installing the units is as nothing when it is considered that human lungs cannot be bought at any price.

Our attention was drawn to this problem by the projectionist of the R.M.S. *Coronia*, who visited your office and indicated he had seen the Arcvent in operation while his ship was docked in Liverpool.

Enclosed in Mr. Durban's communication is the following letter from the manager of a British theater in the provinces:

Works Out Perfectly in Practice

We are in an exceptionally exposed position, standing on a hill with no sheltering building near and from 5-9 miles of open country in any direction. On the southern and westerly sides is a high range of hills with Salisbury Plain on the other side, so the prevailing winds come with a fierce blast and the first object to stop them is our theatre.

So we have had a fierce down-draught in the Arcvents. No mirror has been shattered through this, and it used to be the normal thing to carbon-up with the fumes from the other arc blowing into one's face: on windy days fumes and smoke would pour out of the lamphouses. I am happy to say this is now a thing of the past, and the air in the projection room is clear and dust-free. What did cause some surprise was the definite increase of light towards the end of the performance, due to non-clouding of the mirrors.

* * *

QUESTION. Thanks for your recent article on splicing CinemaScope film (Dec. 1953). There are a few questions I would like to ask though. First, I have not had much luck with the wire brush. Could you help me out on this. Second, will you find enclosed some splices that came loose in the projectors while we played "The Robe" in our town. Two of these caused me to stop the show and rethread. The rest came loose on the rewind. I have had much trouble with patches of this kind before. Could you please tell me why the exchanges have discontinued the one-hole splice.

LAMAR MCKINNON,
Rose Theatre, Thomasville, Ga.

ANSWER. You do not state in your letter exactly what trouble you encountered in using the wire brush. However, its manufacturer states that the edges of the wires sometimes become slightly bent and tangled after a period. This can be corrected by carefully twisting the strands with a circular motion or, if necessary, by sniping off a small portion.

You also mention that some exchange splices came loose while you were projecting "The Robe." The samples of broken splices you sent were made on an automatic splicer which cuts the film in a slight arc,



when you use
SUPER-SNAPLITE
projection lenses

Yes "MOVIES ARE BETTER" and they're "BETTER THAN EVER" if you use Super Snaplite f/1.9 Projection Lenses. These superb lenses give you maximum light, maximum sharpness, and maximum contrast . . . maximum viewing satisfaction for your patrons.

True speed of f/1.9 in every focal length up to 7 inches.
Ask for Bulletins 212.

®K C *"You Get More Light with Super Snaplite"*

KOLLMORGEN Optical CORPORATION
PLANT:
Northampton, Massachusetts
NEW YORK OFFICE: 30 Church St., New York 7, N. Y.

avoiding a patch over the sprocket holes. This type of splicer usually gives good results with the standard type of film not employing magnetic sound and should do equally well with CinemaScope provided the film is properly scraped on both sides and the splicer is in proper adjustment.

A disadvantage is that, since the operation is automatic, it is difficult for the inspector to make absolutely sure that the magnetic striping has been completely removed from the sprocket hole area and the correct amount of cement applied. It may be that further changes in addition to resetting the register pins will be necessary in order to better adapt this splicer to CinemaScope film.

The wire brush is very important in projection-room splicing of CinemaScope film. The sprocket-hole area is delicate and easily torn if scraped too much with a blade, making the brush most valuable in removing traces of the magnetic stripping. Also, the particular pressure clamp arrangement in the Neuscope bench splicer, which is designed especially for CinemaScope film, makes it necessary to condition the splice area with the wire brush if the best results are to be obtained.

CinemaScope Lens Mount

A universal lens mount, designed to simplify the problem of switching from CinemaScope to standard projection during a show in a projection room equipped with the usual two projectors, has been developed and marketed by Projection Products, 146 East 151st St., New York City.

The attachment is designed for use with Simplex projectors using lenses with 2-25/32 inch diameter lens barrels. Space considerations in the projector prevent using a similar lens mount capable of accepting a 4-inch lens because there would not be sufficient space for the vertical and horizontal adjustments of the larger lens which the universal mount makes possible.

According to Dave Corbett, head of Projection Products, the need for this lens mount may be stated briefly as follows: If an anamorphic attachment is removed from a projector to show a newsreel or other type of standard film, it will be found that the lower edge of the screen image is raised slightly so that the masking will not meet the edge of the picture. Since masking moves in from the sides or down from the top of the proscenium, but not up, it is necessary to compensate for this horizontal displacement by slightly changing the position of the lens then in the projector.

There is also a vertical or side-to-side displacement. In addition to becoming smaller, the image on the screen is displaced vertically by from 1 to 3 feet when a standard film is projected. This displacement is also compensated for.

Corbett, who has had 15 years experience in the repair of projection machinery, opened his present well-equipped machine shop in 1950. He does a variety of repair work for customers throughout the country in addition to research and development work and the manufacture of special parts. When the rush for 3-D equipment was on last year, Projection Products did a brisk business supplying mechanical interlocks and 25-inch magazines. The shop is now also engaged in producing experimental rear projection equipment.

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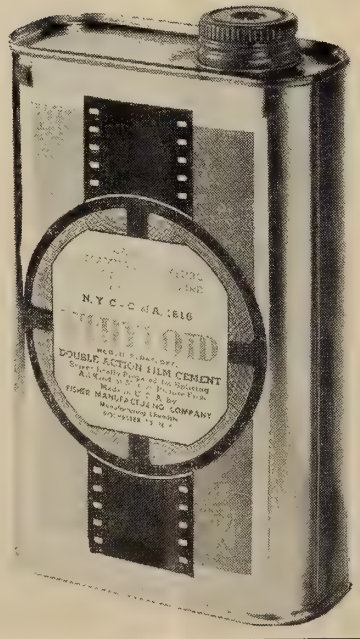
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Give Ethyloid Film Cement a try and you'll use it always. Make your next film cement order Ethyloid, you'll be glad you did, especially when you splice 3-D and CinemaScope prints. We guarantee you won't have to reinforce your splices with cellulose tape to make them hold. You're in trouble when 3-D or CinemaScope splices come apart during projection. (They say it has happened!)



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PERSONAL NOTES

CLARENCE W. LINDROSE, JR., of Hertner Electric Co., Cleveland, has been appointed to the firm's Transverter sales and service field staff. He will work out of the Cleveland factory office, covering the continental U. S. and Canada, and call on National Theatre Supply branches in 29 major cities, as well as the General Theatre Supply Co. in Canada.

EDOUARD P. GENOCK has been appointed head of Tv production at the Eastman Kodak Co. Genock has been engaged in a variety of editorial and technical work for radio, motion pictures and Tv over a period of 25 years, having been active with March of Time, Paramount News, Telenews and others.

JAMES S. BROWN has been appointed division manager of a newly established Chicago-Milwaukee sales territory for Ampro Corp., Chicago, manufacturer of motion picture projectors and tape recorders. Formerly a midwest territory representative, he will now be responsible for dealer appointments, dealer salesmen training, and the conduct of merchandising programs in his new territory.

DR. JOHN G. FRAYNE, engineering manager of the Westrex Corp., left Hollywood recently on a two-month round-the-world trip, which will include visiting ten of the countries where Westrex has supplied large quantities of theatre and studio equipment. Dr. Frayne has been closely associated with sound reproducing and recording activities in the motion picture industry since 1929, and is an expert on magnetic sound.

JOHN JIPP has joined the Ampex Corp., Redwood City, Calif., as manager for instrumentation recorder sales for the firm, which also produces theatre sound equipment. Jipp was formerly with Motorola, Inc., for which he established a West Coast parts and service depot.

WILLIAM E. ROBERTS has been elected to the newly-created office of executive vice-president of Bell & Howell. A 17-year veteran with the company, Roberts has been vice-president in charge of operations since 1951. During World War II he was responsible for the production and sale to the government of Bell & Howell optical and photographic equipment.

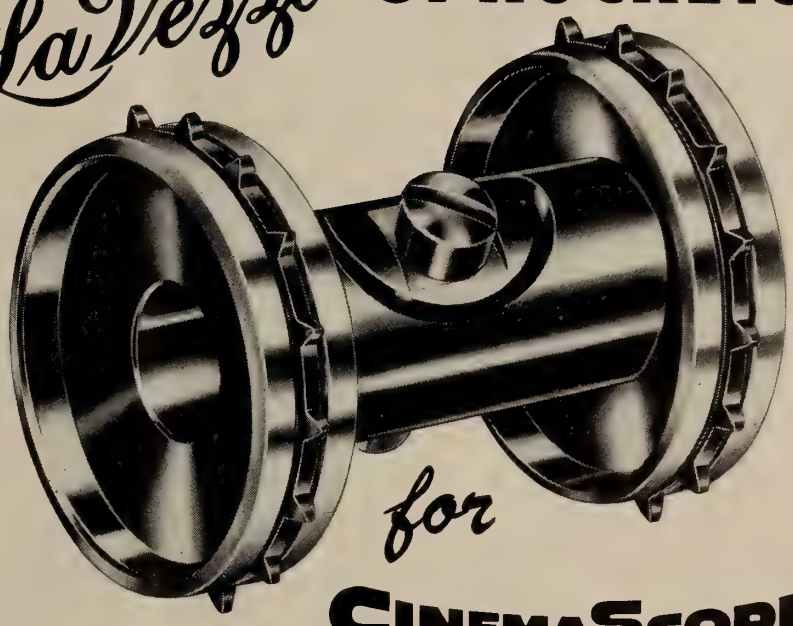
Mobile 3-D, 16-MM Theatre

The Ramsdell-Victor 3-D system has been installed in what is believed to be the first mobile three-dimension theater in the world. The 16-mm projectors by the Victor Animatograph Corp., Davenport, Iowa, are being put to work for industry by the Cincinnati Lathe and Tool Company for the showing of its 15-minute, 3-D film, "A Way of Thinking." Produced by Floyd Ramsdell, of Worchester Film Corp., Worchester, Mass., the film dramatizes production methods of C. L. & T. and is being shown to metalworking shop operators, vocational school leaders, and industrialists.

Two mechanically-linked Victor 16-mm motion picture projectors are installed behind the driver's seat of the "Magic Carpet" 14½-ton coach. The theater seats eight.

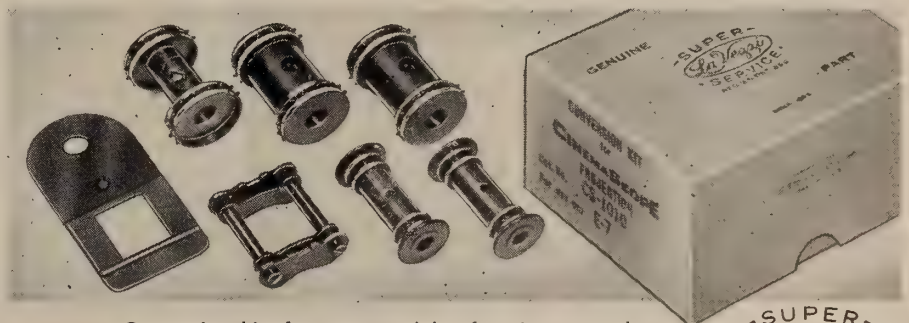
The famous Victor Safety Film Trips play a vital part in projection of this valuable three-dimension venture by C. L. & T. The Trips (standard on all Victor 16-mm projectors) automatically stop the projectors in case of film emergency, and if a loop is lost during projection, the entire system is protected until adjustment is made.

LaVezzi SPROCKETS



for CINEMASCOPE

The new wide screen presentations demand rock steady projection which for years exhibitors have been expecting and getting by using LaVezzi sprockets. In addition, the clean burr-free teeth are easier on the film—an important factor with the narrow perforations of the four stripe magnetic film. LaVezzi sprockets are properly engineered to resist wear—and are hardened for that extra margin of usable life. For better projection and peace of mind get LaVezzi and be sure!



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Brush-up on Fundamentals

Rectifiers for Projection

AN ELECTRONIC rectfier is a conversion device, an electrical "One-Way Street" as it were, which will allow current to flow in one direction only and blow the whistle if it tries to obey its impulses and run back again. This conversion, or rectification, is really a simple business and the circuitry necessary to turn the trick is quite as simple.

Projectionists and theatres have no monopoly on unidirectional electric power. Electro-plating, battery charging as done at the corner garage, general laboratory work, even home radio and television sets, all need some sort of device to change the alternating current from the public power lines into direct current.

However, in this piece we are concerned only with rectification as regards theatre projection requirements and, while the film business twirls like a Dervish full of hashish, with a few crystal ball looks at the future.

The Transistor Era

As IP sees it, the electronics part of the amusement business within a few years will have come full circle, from the crystal of the old-time "Hey, I got me Pittsburgh!" crystal radio set to the ultra-modern germanium, silicon or whateverelse "crystal" transistors of tomorrow.

To the projectionist, no matter how big or how small his theatre, rectifiers provide him with the direct current he must have and cannot get from the alternating current city mains. His principal demand is for DC amperage for operation of carbon arcs and sound amplifiers.

Rectifiers play the field. They exist in a plentitude of sizes, shapes and types, from the aforementioned cat's whiskers and radio crystals of almost pre-historic time (that's BC — Before CinemaScope) through mercury vapor tubes, diode vacuum tubes, and dry plate rectifiers to the new transistors. While these latter, so far, have had little application in the picture business (except in Hollywood where the big brains run on very low amperages anyway), the tiny transistor, with its amazing stability and unbelievably long life very rapidly is replacing other more costly and less efficient units in many fields. However, excluding generators, the diodes (or two filament) tubes and the dry plate rectifiers, either the copper oxide or the newer selenium types, still provide for immediate projection requirements. The crystaline transistors, so the omens say, are still in the not so distant future.

Seleniums Are Efficient

Most projectionists are quite familiar with diode tube rectifiers but many have not had a chance to get cozy with the relatively new seleniums, although projection processes requiring very high amperages demand rectification devices far beyond the capabilities of the usual theatre-type vacuum tube. Seleniums can handle the heaviest projection requirement. One top manufacturer in the field, for example, the Federal Telephone and Radio Corp., operates its Nutley, N. J., plant around the clock with seleniums. The plant pulls some 21,000 amps. Variable loads from zero to 5,000 amperes are under pushbutton control. The company's electro-plating selenium rectifiers supply up to 10,000 amps from a 220-volt, three-phase, 60-cycle source. On that basis a selenium rectifier should handle easily the 180 amps of 3-D or CinemaScope or the sometimes heavier drive-in demands.

[TO BE CONTINUED]

Projection Optics And Curved Screens

A GOOD projection lens is designed to form an image on a plane surface. The light rays contributing to the formation of *each point* on such image (italics ours — Ed.) emerge from the aperture of the projection lens, 2 inches or so in diameter, and 100 feet or more away.

The cone of light thus formed has a very small included angle and, in consequence, a displacement of the screen a few inches from its theoretical plane surface would have little or no visible effect upon the image quality.

A sufficiently concave screen would have some effect upon the distortion of the screen image when viewed from a position to the extreme right or left of the theatre. Figures on the far side of the screen from the observer would appear somewhat less distorted, since the viewing angle would be less acute; those on the near side would appear *more distorted* (italics ours); and those in the center would remain unchanged. Whether these results would be of advantage to the audience we cannot say.

Investigation Needed

This matter of curved surfaces would need, and seems worthy of, much more thorough investigation and some tangible information if one is to properly evaluate its worth or lack of it. Thus far the proponents of such screens have offered nothing that would provide the basis for such scientific appraisal.

It appears that the manufacturers of such screens consider each installation as an individual problem and that each screen must be specially designed on the basis of width of theatre, screen size and length of throw. An analysis of a typical situation of this sort and of the method whereby the curvature of the screen is computed would be of considerable interest and a most worthly contribution to the literature of the art.

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PENSION PROTECTION

(Continued from page 21)

credited service, etc., that relatively few workers can qualify for full benefits — is not likely to be substantially higher than his share of the contributions which would be necessary to fund the same level of pension benefits through the S. S. system.

The S. S. system provides those benefits, not just to those few who manage to reach age 65 after long and unbroken service with a single employer, but to all workers who are employed anywhere within the range of S. S., regardless of how many times they change jobs.

The prospect of employer support is a very poor reed for labor to lean on in its efforts to secure genuine and necessary improvements in the S. S. program. The type of support that employer groups would be likely to give would be a very dubious asset at best — for the superficial improvements that might result might also involve other changes which could have the effect of undermining the soundness of the program.

Craft-Wide Programs

What would seem more likely to ease employer opposition to further improvements in the Federal Social Security system would be the prospect that unions might otherwise press for the wider adoption of collective bargaining plans that provide the same type of protections and the same continuity of coverage as does S. S. — through liberal vesting provisions and industry, area and craft-wide programs.

Plans of this type would be more costly to the employers involved, per unit of benefit, than would an improved Federal system, and would thus offer a very substantial inducement to employers to avoid such a development by supporting a liberalized Federal system — regardless of whether or not an "offset" device is employed.

[CONCLUSION]

Those Tinted Windshields!

Fears that tinted windshields will damage the drive-in theatre business are unfounded, according to a recent report by the Automobile Manufacturers Assoc. Effect of the tinted glass is negligible upon both black-and-white and natural color screen images, it was stated.

The tinted windshields, usually green, are a new development in the auto industry, and are described as heat absorbing. A small amount of iron in the glass composition is said to absorb about 51% of solar heat. The amount of tint resulting is actually less than is found in many eyeglasses of the slightly tinted type (not sunglasses) now being widely used.

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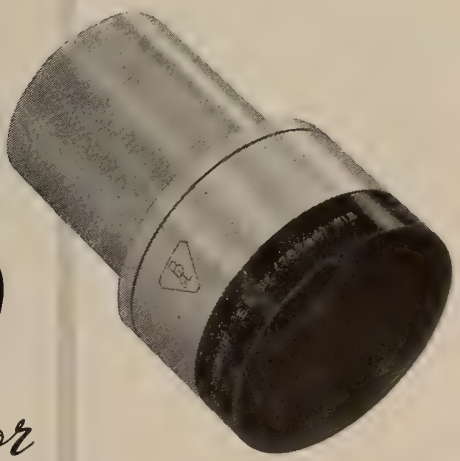
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FLAT SCREEN FOR PREMIERE THEATRE

(Continued from page 16)

less Hy-Candescent condenser arc lamps, burning at 170 amperes, the same level as before CinemaScope installation. Our standard cooling unit is the Simplex heat filter which removes heat from the projection beam by means of staggered strips of heat-absorbing glass, air cooled by a blower unit with its own motor and fan.

Our stereophonic sound system was manufactured and installed by RCA, including the "penthouse" soundheads mounted on the projectors. The speaker system includes three stage speaker units, one at the center and two side-speaker units which are mounted on movable towers that are quickly rolled off the stage just before the "live" show. Plans are underway to fly these speakers also so that the stage can be cleared in the least possible time.

Altogether, the biggest problem to be solved in making the CinemaScope installation at the Music Hall was the selection of the most suitable type screen. Before installation of the present screen, a number of tests were made by myself, John Jackson, stage manager, and Eugene Braun, director of lighting, with the cooperation of the manufacturers of the Magnaglo-Astrolite screen. Four different types of screens were tested in addition to four different panels of screen material before a selection was made.

Light Is Adequate

Other tests included a light meter examination of the screen. We found both center and side adequately lighted. Eye examination of the picture from many different angles in both orchestra and balconies pleased everyone. Use of a flat screen was felt to have another advantage to us in addition to economy of stage space.

Another interest during the screen tests was to reduce the faint horizontal lines visible when light shined on the screen. It was found that these lines were slightly more noticeable toward the bottom of the screen when viewed from the balcony. For that reason a reverse method of "shingling" was used in the joints of the lower panels where the projection beam strikes at the sharpest angle.

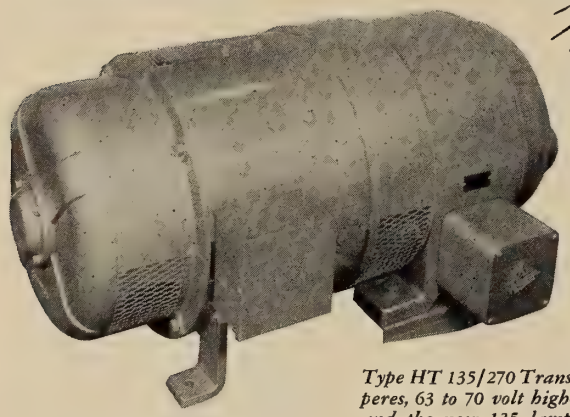
In conclusion, I want to mention again the flatness of the screen. Before it was installed we were naturally concerned because a curved screen, which we couldn't use, had been required by 20th Century-Fox for its CinemaScope projection method, but we now feel that the peripheral-vision depth effect can be maintained on a flat as well as the curved screens usually employed for CinemaScope.

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New Pola-Lite Beam Splitter

Theatres interested in an inexpensive beam-splitting device for single-film 3-D propection may want to consider a new "package" plan being offered by the Pola-Lite Co., of New York City. A light-weight beam splitter that clamps on the projection lens can be had for $100 by any theatre contracting to buy 6,000 pairs of Pola-Lite glasses at 10 cents a pair.

Presently the biggest stumbling block in the path of single-strip 3-D systems is the lack of films printed for the process. Pola-Lite believes that it has made a good start toward solving this problem by arranging with Universal to obtain prints of two newly-released 3-D features with the double images printed side by side on the same frame for beam-splitter projection.

LENSES: Projection Heart

(Continued from page 14)

it is being exposed on the screen, its rapid movements parallel to the optical axis produce an out-of-focus effect that cannot be corrected by manipulating the focusing knob. This peculiar blur is seldom noticeable with long-focus lenses, but it is exceedingly troublesome with short-focus lenses.

Print Age, Condition

New prints fresh from the processing laboratory give more trouble in this respect than old, well-seasoned prints that have been projected many times at normal arc amperages. A new print lies quite flat in the aperture *when not illuminated,* hence the pincushioning must begin from "zero point" when flashed by the arc beam. In other words, the middle of each frame moves along the optical axis from the zero point of flat film to maximum-buckle point each time the rotating shutter allows light to strike the film.

An old print, on the other hand, is to some extent already pincushioned, or permanently "frame embossed." Further exposure to heat has little effect upon it; and since the pincushioning of the frames is nearly at a constant value, the film flutters but very little, and the lens is able to maintain an excellent focus.

This is not to say that all old prints present no focusing problems. A print that has spent a summer making the rounds of large drive-in theatres is usually so badly buckled that it cannot be kept in focus for even a minute at a time. And heat filters are powerless to prevent a heat-damaged film flopping in and out of focus.

Picture Focus Drift

A small amount of focus drift is found even in prints that have not been punished by projection at 120 to 175 amps. With long-focus lenses, normal focus drift is practically invisible, and projectionists who operate in long, narrow theatres need refocus during the running of a single reel very seldom. When lenses of 4 to 5 inches E.F. are used, normal focus drift often requires frequent sharpening of the focus. With short-focus lenses the situation is practically hopeless.

The causes of normal focus drift are not fully understood. Some authorities are of the opinion that variations in the moisture-content of the emulsion are mainly responsible, while others lay the blame on the curl which is set in the film by being wound tightly on a reel. There are probably other factors, the winding of soft, new film on small-hubbed reels immediately after processing, for example.

Because focusing must be done rather frequently in theatre projection, it has developed into something of an art. It should be done *inconspicuously* so as not to divert the audience. Briefly, the knob should be turned slowly in the correct direction; and when crisp clarity of image has been attained, the turning of the focusing knob should stop then and there. Finesse is required.

Depth of Focus Variations

We have mentioned "depth of focus" several times. Fig. 1 shows how this varies with different types of lenses. The smallest image of a point which any lens is able to produce is not a point at all, but a small disk — a "circle of confusion." With every lens there is a slight leeway in the position of sharpest focus. The lens can be moved back and forth within these narrow limits without increasing the size of the smallest circle of confusion, hence without affecting the clarity of the image on the screen.

Slow lenses and those of long focal length have greater depth of focus

SPLICES NOT HOLDING ?

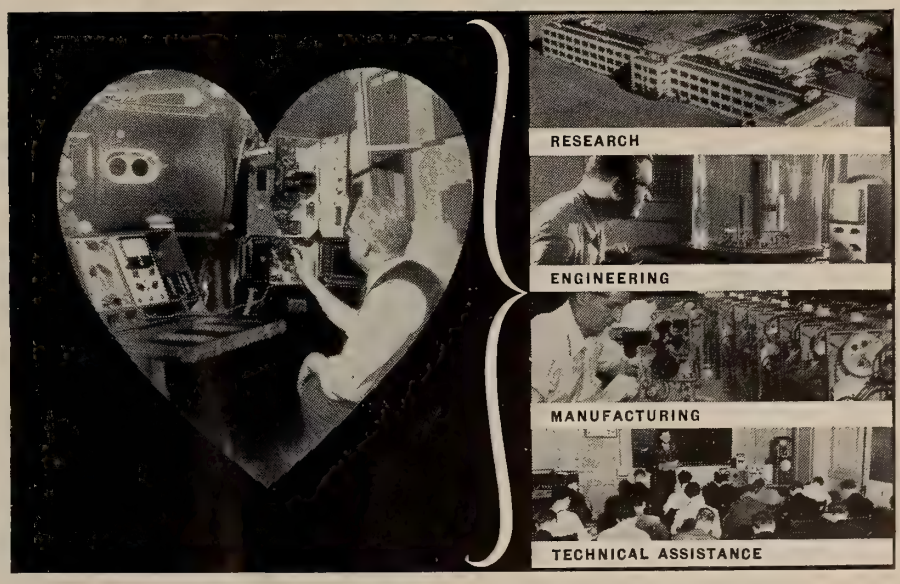
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than fast lenses and those of short focal length simply because the angles formed by the light rays produce a wider range wherein the smallest circles of confusion do not materially change in size.

We may visualize depth of focus as a region between two nearly parallel planes which limit the range of sharp focus. The film, naturally, must lie in this region in order to appear in focus on the screen. If the film flutters outside the limits of this critical region, then it will temporarily go out of focus. The projectionist, when he focuses the picture, moves the entire region of sharp focus *into the film!*

Film Flutter Range

The amount of negative buckling, or pincushioning toward the lamp, may actually exceed 0.02 inch at high amperages, but at lower arc currents it is normally only 0.005 to 0.01 inch. This is the normal range of flutter in brand-new prints, and it closely corresponds to the depth of focus of lenses in the 6-to-8-inch E.F. class.

With well-seasoned prints some of the buckle has been embossed in the film, and the flutter consequently is less than the total amount of bulge as measured from the zero-point of a perfectly flat film-plane. In such a case the flutter-range may be much less than the 0.002-to-0.004-inch depth of focus of lenses in the 4-to-5-inch E.F. class, and accordingly quite invisible on the screen.

But with fast, short-focus lenses, as pointed out previously, the depth of focus is so small that even the slightest amount of buckling and flutter will obviate a good screen-image — *even if the lens itself be perfect!* And we wish to repeat, also, that it is usually necessary to use the most powerful lamps with short-focus lenses for adequate screen illumination, and that these lamps increase buckling and flutter. Projection quality thus finds itself the victim of a vicious circle from which there is little possibility of escape. The lens manufacturers cannot help us, but the film manufacturers can by inventing a more suitable film for high-powered projection.

High-Powered Arcs

A perfect motion picture screen image is still the dream of projectionists; but cold reality makes us wonder if our dreams will ever come true. It seems that every technological innovation of the past few years has deprived the movies of some of the pictorial excellence which all of us took for granted a couple of decades ago. The matter of acetate safety film has been mentioned. The excessively high-powered arclamp is another innovation. Designed at first for the large drive-ins that require them, such lamps are excellent devices for raw lumen-production. But no one really expects or looks for top-notch picture-quality in a drive-in. It is the increasing use of these lamps in *indoor* theatres that is objectionable.

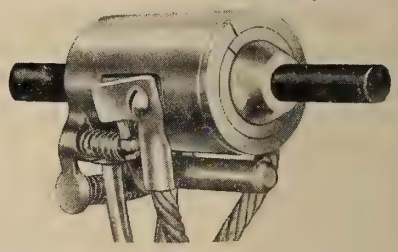
Objectionable or not, however, powerful lamps must be used for illuminating gigantic screens for normal projection and wide screens for CinemaScope presentations. It can

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be reasonably argued that, in America, indoor theatres are too few and too large.

In 1947 a lamp manufacturer declared that "it is impractical to use more than 1500 lumens, as it would damage the film. . . . It is furthermore wasteful, as well as futile, to burn more than 70 amperes in any reflector lamp." We heartily agree. And yet that same manufacturer has subsequently marketed several 90-amp., 120-amp., and 135-amp. reflector lamps which are, admittedly, absolutely necessary for 3-D and wide-screen projection, *but with unavoidable deterioration of picture quality.*

Apart from its dullness and the clumsiness of its technique, polarized-light 3-D has nibbled away at pictorial quality in other ways, well known to the reader. So let us pass on to the latest, most expensive, and most heavily financed process, CinemaScope.

CinemaScope Presentations

CinemaScope has destroyed trueness of pictorial perspective with its curved screen. Its anamorphic optics has indulged in a damaging whack at image-definition. (CinemaScope focus is sometimes awful and sometimes fair, but never good.) And, like true 3-D, CinemaScope demands the use of film-withering arc currents.

The widespread use of short-focus lenses for the projection of standard-format pictures is due in no small measure to the present aspect-ratio fad. The worst effects, of course, are produced by the small depth of focus of short-focus lenses; but there is another very important point to be considered. Celluloid personages are daily suffering various degrees of decapitation and amputation by such extreme aspect-ratios as 1:2.5, 1:2, 1:1.85, 1:1.75, and 1:1.66. It is impossible to trim such large areas from the top and bottom of a standard-format picture without scalping someone in the close-ups. Pictorial surgery of this sort is utterly barbaric — and a bit unfair to the cash customers.

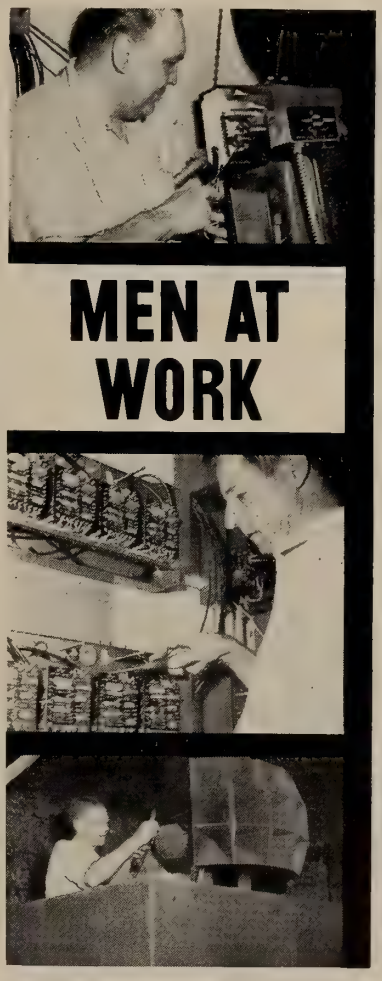
It is hard to escape the conclusion that the use of undersized apertures is a species of optical cheating. No matter how thin the conventional picture is sliced, it isn't Cinerama, and everyone knows it.

The standard format is 3:4 or, more exactly, 2.9:4, which corresponds to an aspect-ratio of 1:1.37. It has been in use ever since the movies came into being, and it is extremely adaptable, suitable for both close-ups and long-shots. However, a slightly wider picture might indeed be an improvement. An aspect-ratio of 1:1.5 suggests itself as a picture-proportion which would not interfere with the dramatic fluidity of the movies.

Recommended Aspect Ratio

But we do not recommend that the area of a standard picture be cut down by the use of a 1:1.5-proportioned aperture. What we do recommend is a wider film to accommodate such a picture without loss of picture detail and without loss of footage due to thick framelines or interframe spaces. Such a recommendation, however, might not seem sufficiently spectacular to an industry which is interested only in applying expensive frosting to the same stale cake. In fact, film standards should have been radically revised when the inception of sound-on-film offered an excellent opportunity to do so.

It is only fair to state that a clever use is made of short-focus lenses in a few theatres by reserving them only for selected scenes in certain types of feature films and for one or two of the



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short subjects. This is essentially the idea involved in Harry Rubin's famous Magnascope lens, the *judicious* use of which increases the effectiveness of mob scenes and other spectacular shots, especially when photographed in natural color.

Special Aperture Plates

When such a lens is used as a novelty, it is necessary to have a large screen and motor-controlled, or manually-operated, movable masking in order to expose the entire area of the large screen for the highly magnified picture. Moreover, since the bottom edge of the regular, small picture and the bottom edge of the large picture coincide, there must be some provision for raising the image somewhat when the short-focus lens is used. This may be done by inserting a special aperture plate having a slightly lower window, or else by raising the short-focus lens so that its axis lies above and parallel to the optical axis of the projector.

Because it is impossible to switch quickly from one lens to another for special scenes within a reel, even when each lens is clamped in a prefocused mount, the most that can ordinarily be done is to use the short-focus lens for selected *whole reels*. It is always possible, of course, to break up a long reel into several short rolls; but this procedure is bothersome to the projectionist and discountenanced by the film exchanges.

All of these difficulties may be hurdled by using a "zoom" lens. This is a lens of variable focal length. When it is desired to enlarge the picture, the projectionist merely turns a knob which alters the distance separating the several elements of this special-effects lens.

Motor-controlled masking is mandatory with the zoom lens because the regular-size picture does not look pleasing on an open, oversized screen. This is a considerable expense.

'Trick' Lenses—Yes, But . . .

At all events, the zoom lens should not be used for regular projection when no zoom effect is to be used. A lens can be adequately corrected optically for one definite focal length only. Change the focal length by changing the distance between the elements, and serious aberrations creep in to mar the picture. "Trick" lenses, therefore, should be reserved only for occasional use, and never kept on for the projection of an entire show. It should be remembered that a large part of their effectiveness is due to the *change* which takes place in the size of the picture before the eyes of the audience.

The cost of a zoom lens is even more shocking than that of a CinemaScope lens. Unlike all other projection lenses, zoom lenses have moving parts and are custom-built. The average theatre cannot afford them.

[TO BE CONCLUDED]

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IA OBITUARIES

JAMES G. CAMPION, 66, charter member of Local 498, Kansas City, Kans., died February 11 from a heart attack. A native of Canada, he came to Kansas City in 1903 and helped to organize Local 498. He served the Local as its business representative for 30 years until 1949, when ill health forced him to resign from office. His son, Edward, was elected to that post upon his father's retirement. During World War II, Campion was a special organizer for the AF of L, and also served on the Wyandotte rationing board.

He is survived by his wife and son.

HARRY W. WILLIAMS, 58, president of Local 626, Nashville, Tenn., succumbed to a heart attack on February 3 as he was about to report for work at Loew's Theatre, where he had been employed for the past 30 years. "Puddy" Williams, as he was known to all his friends, was a charter member of the Local and was extremely popular with the membership.

WILLIAM F. WEISHEIT, 64, member of Los Angeles Local 150 since 1928 and a charter member of Hollywood Studio Projectionists Local 165, died suddenly on February 6. Born in Dubuque, Iowa, Weisheit came to California just before the turn of the century. He joined the projection department of 20th Century-Fox studios in 1928. In 1933 he was appointed projection supervisor for Fox studios, a post he held until the time of his death.

Weisheit was a highly skilled technician and was active in the pioneering development of 20th Century-Fox's CinemaScope and stereophonic sound.

He is survived by his wife and two daughters. Masonic services were held in Beverly Hills, Calif., on Wednesday, February 10.

Fox Restricts 'Scope Lenses

Use of Japanese and German anamorphic lenses for the showing of CinemaScope pictures released by 20th Century-Fox seems to be effectively ruled out in new contract terms with exhibitors set by the film company.

The contracts, it is understood, call for the use of Bausch & Lomb or Bell & Howell lenses only.

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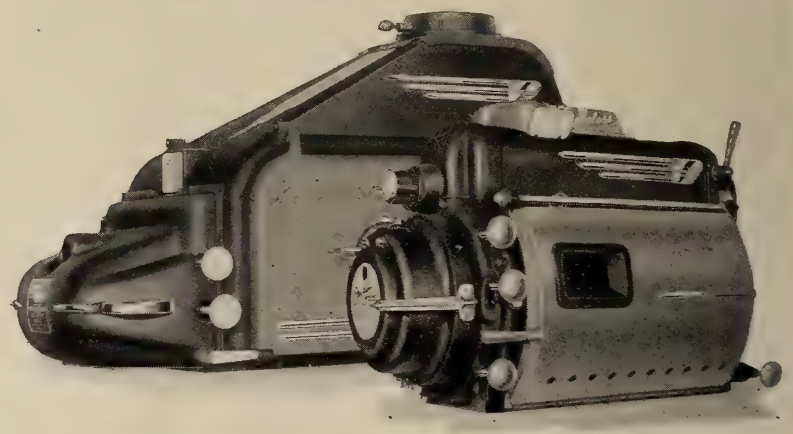
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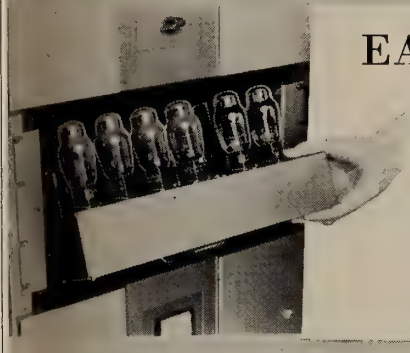
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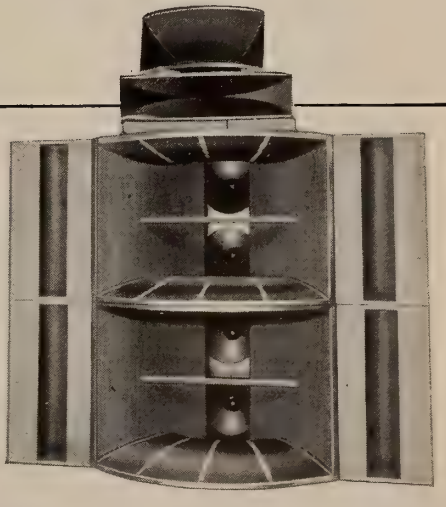
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9

MONTHLY CHAT

?

Standard 2-D, 3 x 4 pictures

Cinerama

CinemaScope

VistaVision

Variable prismatic anamorphic units for varying ratios

Two-film 3-D

Single-film 3-D beam-splitter (Pola-Lite) with glasses

Single optical track sound

Stereophonic sound, with a mass of amplifiers and speakers

3-D viewing glasses

3-D projection filters

3-D projector interlocks

Varying screen proportions as to both height and width

Seamless screens

Screens with seams

Standard sprockets

Narrow CinemaScope sprockets

Multiple magnetic sound tracks

Single magnetic sound track (wanna bet?)

Curved screens (indeterminate radii)

Flat screens

Triple in-car speakers

?

The foregoing list comprises the muck and mire of the technological swamplands which the harrassed exhibitor is expected to traverse accompanied only by a sharp, persistent fear for his future security. It is also the hazard which demands of the projectionist that he be a hydra-headed, many-tentacled entity with an Einsteinian mind in order to cope with not only the day-to-day changes in projection setups but also the changes within a given program!

These are the technological standards (?) of an industry which once boasted of its position as the fifth largest in the world. This is a situation which can't possibly be anything else but a snide effort precipitated by the industry's so-called executives who wish to retain the plush seats of the mighty and, of course, the emoluments accruing thereto.

If there be even a trace of sanity left in this industry, then in the name of simple, common decency let us exercise it.

J. J. FINN



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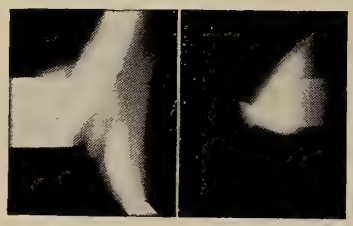
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INTERNATIONAL PROJECTIONIST

VOLUME XXIX APRIL 1954 NUMBER 4

As Of The Moment . . .

By JAMES J. FINN

This is another in a series of definitive articles which IP directs to its readers and all those who are interested in the latest technical developments and, consequently, the economic well-being of the industry.

ON THE basis of present developments, 3-D presentation is just floundering around. Maybe Technicolor's astute management will come up with the answer to single-film 3-D projection — and it is hardly conceivable that an organization such as Technicolor would go to any great technical or economic length to prove a point wrong. However successful their efforts, the cruel, inescapable fact remains that analyzers (viewing spectacles) would be required for exhibition purposes — a process which IP has always regarded dubiously.

What Went Wrong?

3-D pictures were mangled on both the production and projection ends. IP can only reiterate those questions which it has posed repeatedly, as follows:

In the 3-D field, did it work out correct 3-D camera methods and correct projection equipment and processes *in advance?*

Did it provide reasonable size reels and enough projectors to handle the job sensibly and without long and unpleasant intermissions?

Did it put good stories into 3-D? And did it furnish acceptable 3-D spectacles for the audience? Were the 3-D pictures on the screen bright enough?

Did the producers enthusiastically support 3-D with their *best* directing, acting, writing, and technical talent?

Did the enthusiastic audience reaction to the handful of, at least, fair 3-D pictures jar the producers into producing more and better 3-D pictures?

Were the problems of the studio, the box-office and of Labor all sympathetically and intelligently considered?

To all these questions, the unfortunate answer is a re-sounding "No!"

In any event, IP can never lend assent to the use of viewing spectacles for motion pictures unless some radical improvement is effected.

Production, Exhibition Values

Cinerama was and is the first really honest effort to deal with a wide-screen picture. Why? Because both in production and in projection they did not cheat on production values, projection, or Labor. It is unfortunate that the economic status of the industry, no less than the deplorable lack of acceptable subject material, militated against the widespread use of this system. Moreover, certain technical deficiencies, including a view of Niagara Falls flowing *upward* when viewed from the balcony, indicate that the structural characteristics of existing theatres are woefully deficient in terms of viewing conditions.

Examining the Record

Now we come again to the CinemaScope process which has the industry in such a dither. It is undoubtedly true that the exhibition of CinemaScope productions has to date resulted in a profit for exhibitors and has given the industry an economic "lift." However, while IP is and always will be interested in the economic health of the industry, its primary task is to convey technical information. To this end IP is of necessity forced to restate its original evaluation of the CinemaScope system, as follows:

1. Historically, there is nothing *new* about Chretien's anamorphic lens. We say this not in a deprecatory sense but only to keep the record straight. Proof of this is readily available by reference to the issue of IP for July 1939, (p. 13) in which a full description of the Chretien anamorphic projection lens, together with an illustration of the "giant" curved screen, was

given (Paris, France, Film Exposition).

C'Scope Proportions Rejected

2. IP is unalterably opposed to the 2.55-to-1 projected picture proportions of the CinemaScope system. This proportion is not only aesthetically incorrect but it provides an image the sweep of which the human eye is incapable of encompassing. Proof to the contrary is invited, especially from 20th Century-Fox.

3. The insistence of 20th Century-Fox upon the use of multiple so-called stereophonic sound tracks is, to our way of thinking, the veriest nonsense. In support of our opinion we offer the accompanying excerpt from a statement by the eminent motion picture critic of the *New York Times*, Mr. Bosley Crowther (January 31, 1954), with which we wholeheartedly agree, and, we are sure, so do countless other moviegoers:

Ear-Splitting Volume

Forgetting the shocking bombardment of multiple-outlet sound that went with the Warner Brothers three-dimensional film, "House of Wax" — which shattering experience, incidentally, is hard to erase from the mind — one still can cite pointed examples of confusion and excessiveness in sound that have been notable in other pictures where the stereophonic feature has been used.

It must be said that a private demonstration, made for a few people here last week, to show the difference between stereophonic and regular single-outlet sound in the crucifixion sequence from "The Robe," did not impress this observer with any overwhelming advantage in the stereophonic device. As a matter of fact, the single-outlet system was more effective.

Confusion the Net Result

In using the stereophonic device to have voices seem to emerge from the screen approximately where the speaking character is, the business of switching from one to another outlet (or alternating the respective volume) as the character moves becomes an obvious mechanical contrivance that confuses the image on the screen. This is so, even when the passage is uniform and smooth. When there is a variation in volume in the different sound tracks, the disturbance is bad.

. . . there remains a question of whether the reproduction of sound, to represent voices or specific noises, is not more uniform and plausible from a single horn.

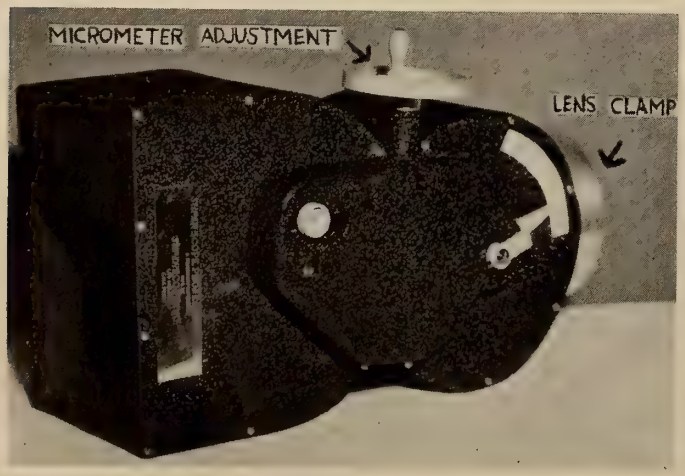
Any sound from outlets away from the screen, however, is superfluous and disillusioning.

Stereophonic sound reproduction, when *properly* applied, would undoubtedly enhance any motion picture presentation, as was fully demonstrated in the "Ave Maria" sequence of Walt Disney's "Fantasia" of blessed memory as an outstanding technical achievement. However, the Hollywood contingent, persisting in their technical ignorance, refuses to insist upon acceptable sound-levels in the theatre.

Auditory perspective is by no means an unknown art, and there comes readily to mind the notable research work done 20 years ago by Dr. Harvey Fletcher, of Bell Telephone Laboratories. These data are available even to the Hollywood technicians who today seem to be reading as they run.

Dramatic Content

Mere *magnitude* of projection screen image as exemplified by the CinemaScope system does not alter one whit the old adage that for entertainment purposes a vital consideration is the *dramatic content* of the picture. The old saying that there can be too much of a good thing may be readily transposed in terms of much too much (screen size) of a *bad* thing.



The Tushinsky prismatic anamorphic lens attachment. This adjustable device is fitted to projection lens in a manner similar to the standard cylindrical type of anamorphic attachment, but can be adjusted to project pictures in a variety of aspect ratios.

In passing, let us not forget that if companies having the industry stature that Paramount and Loew's enjoy are ready to accept the single-optical track system, the method must have some practical merit.

The Fine system (Perspecta Sound) is a sound reproduction process that uses one optical sound track of the standard size and can be adapted for conventional one-channel reproduction, or can also give an effect of stereophonic sound. If no stereo sound is desired, the film need only go through the soundhead in the conventional way. If the theatre be equipped for stereophonic sound, special low-frequency signals, incorporated on the optical track, can cue the sound from the single track to speakers positioned at various parts of the screen.

Prismatic Anamorphoser

There were demonstrated in New York during the latter part of March two prismatic anamorphic lens attachments devised to project motion pictures in any aspect ratio ranging from the conventional 1.33-to-1 up 2.55-to-1 — the Tushinsky lens and the Gottschalk lens.

Such devices are a commonplace in the projection art, having been known and utilized for years in various forms. Prisms are tricky units and involve serious consideration in both their design and application to projection work. The first public demonstrations were given at the RKO 86th Street Theatre in New York under conditions completely under the control of the demonstrators and using *their own film*, all of which was in *color* and of extremely light density. Obviously, such film will pass a much greater amount of light than would a color print of a darker density; and with black-and-white prints the difficulties of light transmission would be pronounced.

Non-Technical Acclaim

These demonstrations met with considerable enthusiasm by a large segment of the industry, and practically the entire trade press went overboard in its acclaim. However, IP is in the projection business, not in the orchid-throwing business, therefore, it arranged for a subsequent *private* demonstration of the Tushinsky device.

At this later private demonstration

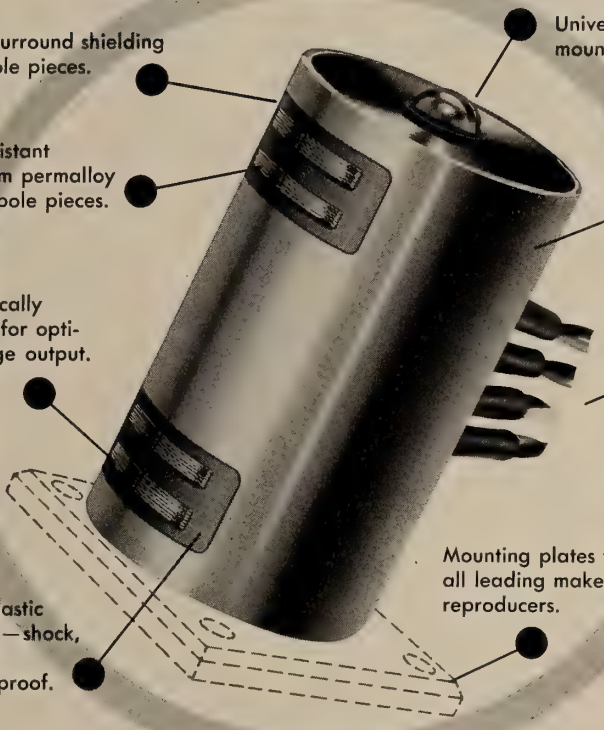
(Continued on page 10)

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for IP, the Tushinsky device accomplished the purpose for which it was intended — the showing of motion pictures in *all* aspect ratios within the range mentioned previously. However, at this showing we used a CinemaScope black-and-white test-pattern film, having both horizontal and vertical lines. Alternate projectors were used to show the difference in both focus and light level between the Bausch & Lomb CinemaScope lens and the Tushinsky prismatic attachment.

Considerable Light Loss

Much to our surprise, the focus of the Tushinsky anamorphic attachment was good and in every respect comparable to that attained by the B. & L. CinemaScope lens. But we were surprised to note that as between the B. & L. CinemaScope lens and the Tushinsky unit there was, to our eyes, a light loss with the Tushinsky unit of approximately 45%!

Now, this was rather an astonishing spectacle, since we couldn't conceive how a rather simple prismatic device employing only two optical elements could possibly induce such a large degree of light-transmission loss. In all fairness to Tushinsky, it must be stated that his effective aperture opening was only 3 ¾", while the projection lens was 4" in diameter. This would naturally have the effect of cutting down his light by reason of his reduced "working" aperture. IP understands that a larger effective aperture will be employed in the Tushinsky unit in the very near future to accomodate the present 4" diameter lens mounts. This could make a whale of a difference.

Eminent Optical Opinion

The light loss occasioned by the use of the Tushinsky unit prompted IP to consult eminent optical authorities. Several theories relative to the action of optical anamorphic prisms, and the possible reasons for light loss, were advanced, as follows:

1. The angle at which the light beam strikes the prism may occasion considerable dispersion and absorption of light *within the housing.*

2. The effective aperture of such a device should be fully equal to that of the projection lens so that it can accept the *full* light output from the latter.

3. Extremely accurate positioning of the optical elements within the housing, which is, of course, a mechanical manufacturing procedure.

4. Possible desirability of *matching* the optics of such a unit with those of the projection lens being used.

5. The speed of the regular projection lens would, if of a "fast" character, naturally magnify any inherent errors in the attached unit.

Two Vital Field Problems

There are other factors to be considered in connection with the use of prismatic anamorphic devices such as the Tushinsky unit. First and most important is the *quality* of the glass used. Next is the positioning of the elements within the housing — a question of precision manufacturing procedure.

Once in the field, there arise two vitally important considerations in connection with such devices: first, theatre personnel (managers, projectionists) may attempt to exercise their *personal* preference for picture ratio to the extent that they use a device such as the Tushinsky unit to project a picture in a ratio in which the picture was *not originally made.* Gross distortion will be the inevitable result.

Next, and equally important, is the fundamental necessity for cleaning any optical element. We all know that in a projection room the accumulation of dust on optical surfaces is a deterrent to good projection. This demands that optical surfaces be cleaned frequently, and this applies with especial emphasis to a device such as the Tushinsky prismatic unit.

Granted that projectionists wish to clean the optical surfaces in the Tushinsky unit, the procedure would involve removing the various screws in the housing and wiping off the prismatic lens. What is the warranty that the elements will be subsequently repositioned in proper alignment?

Healthy Competitive Force

With all the foregoing considerations fresh in mind, we regard the introduction of devices such as the Tushinsky unit as a healthy competitive force in the motion picture indus-

(Continued on page 34)

Variable Prismatic Units

1. The angle at which the light beam strikes the prism may occasion considerable dispersion and absorption of light within the housing.

2. The effective aperture of such a device should be fully equal to that of the projection lens so that it can accept the *full* light output from the latter.

3. Extremely accurate positioning of the optical elements within the housing, which is, of course, a mechanical manufacturing procedure.

4. Possible desirability of *matching* the optics of such a unit with those of the projection lens being used.

5. The speed of the regular projection lens would, if of a "fast" character, naturally magnify any inherent errors in the attached unit.

Lens Pre-Focusing Device

A calibrated device which enables the projectionist to pre-focus a variety of different lenses has been designed by Joe Tritsch, member of Los Angeles Local 150 and projectionist at the Encino Theatre, Encino, Calif. Called the "Focuset," it is a simple attachment by which the projectionist may methodically and accurately index different projector lenses in exact focus.

The device consists of a dial indicator type of indexing mechanism attached to the lens holder casting in such a position that the extended or actuating position of the indexing mechanism contacts the main projector frame casting.

In using the unit, a sharp image is first obtained on the screen and the position or reading of the indexing mechanism noted. Every basic position of lenses needed for various aspect ratios may consequently be determined and their position on the indicator noted. These indexing points remain valid for all subsequent lens positioning so long as neither the Focuset mounting nor the main frame casting is varied.



Handy lens pre-focusing device developed by Joe Tritsch, member of IA Local 150, Los Angeles, and projectionist at the Encino Theatre, Encino, Calif.

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Paramount's VistaVision

By LOREN L. RYDER

Engineering Director, Paramount Studios, Hollywood, Calif.

SIMPLICITY is the keyword for VistaVision. This development sets a new pattern in photography and provides a maximum of entertainment value at a minimum of expense. The fact that theatres the world over may utilize its advantages on *standard* projection equipment makes it doubly attractive.

Paramount's consistent belief that wide-screen presentation is enhanced by adding *height* and the need for greater screen clarity prompted the development of this system. The first step was a method of procuring better original photographic detail. This was accomplished by exposing the area of two frames horizontally on regular 35-mm film, the camera being turned on its side.

Larger Camera Negative

Using a wider-angle lens and pulling eight sprocket holes before the lens instead of the conventional four, a new, large negative measuring 1.472 x 0.997 inches was produced. (Fig. 1). With almost three times the area of a standard 35-mm frame exposed, much more detail was photographed than was possible on a standard frame. Furthermore, scenes can be photographed for best composition in aspect ratios of 1.66 to 1 or 1.85 to 1.

The next step was to get an optical reduction on regular 35-mm film so that it could be shown in any existing theatre without changes in projection equipment. For this a new technique was developed whereby in the printing process the large negative was turned 90 degrees and printed the same as any previous release film (Fig. 2). The net result of such a process meant that the original depth of focus was retained in the reduction and the grain effect was practically eliminated. When projected, the full beauty of the entire scene is reproduced. This is the outstanding feature of VistaVision.

Big Screen Advised

While no added expense is necessary to gain the full quality in VistaVision theatre prints, certain improvements will give greater viewing pleasure and the first and most important is a suitable screen. For those theatres who do not have a big screen, Paramount's recommendation is to provide as high and as wide a screen as the premises will permit.

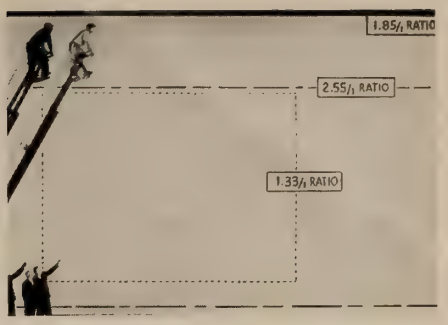
Further, a seamless screen of good quality should be installed and the theatre should *fill the screen with picture.* A first cost for the more advantageous use of Vista-Vision is the screen and with each increment of expenditure better picture quality will result whereby the viewer will see more and get more enjoyment. Good standard lenses and adequate projection light will add to these improvements.



Full-size reproduction of the 35-mm release print made from the double-frame VistaVision negative. Latter is turned 90 degrees and printed down to area shown. Resultant print gives greater resolution.

No Projection Problems

As stated above, a VistaVision release print can be played on any standard projection equipment. Using a standard good quality lens all of the beauty and clarity may be shown in any aspect ratio from 1.33/1 to 2/1 by the simple expedient of masking with a properly shaped projection aperture. (Fig. 3). Light requirements will depend on the screen size and throw.



New VistaVision high and wide screen. Dotted line shows how ordinary motion picture screen size compares with big VistaVision screen. Broken lines shows comparison of 2.55 to 1 ratio screen with high 1.85 to 1 VistaVision.

In very large houses with very large screens it might be advisable to use a variable expander prismatic lens. With it, lens handling becomes simplified and complete light is gained for the entire picture of any size. Paramount will make available both standard and compressed prints; the latter will be made in the ratio of 1.5/1 and will give a screen picture in the ratio of 2/1 when shown through the expander lens. Such a lens may also be used with standard prints and in addition will play compressed prints from other studios.

Standard Sound Track

All VistaVision theatre prints will have *standard* sprocket holes and will carry the regular optical sound track. In addition, each print will have a control track which will control the sound placement in theatres equipped for dimensional sound. It is felt that for most houses, the single horn system will give excellent results; however, dimensional sound will be available and optional.

Since the introduction of wide screens many theatres have found that the front seats are even less desirable than in the past. With VistaVision, these seats are regained for the exhibitor for with its exceptional clarity and lack of film grain, pictures down



Full-size reproduction of the VistaVision camera negative showing size and placement of the image. Note clarity of detail.

front can be viewed with comfort. In fact, they will probably be better than ever before and this will be apparent in all theatres regardless of size.

While it has already been said that neither wide screen, 3-D nor stereophonic sound can substitute for a good picture, given a reasonably good production, VistaVision will make it better.

Ryder Explains Par's Position on Screens

IN CONNECTION with this VistaVision "new look," Paramount wishes to re-emphasize the need for bigger and better screens. Exhibitors and paying patrons alike, in every community, are becoming acutely wide-screen conscious, with many such units already installed, but there still are many exhibitors who are undecided on this point.

Paramount feels that it is a distinct advantage to every theatre to install a screen that has *height* as well as width, and where the theatre is capable of accepting it, a screen ratio of 1.85 to 1 is our choice. This would apply to *all* medium and large houses, where we found after a series of tests that the same scene always looks better and the actors can be brought *closer* to the audience as the screen *height* is increased with respect to the width up to the ratio of 1.85 to 1.

Factors Affecting Screen Size

Screen height the same as screen width is usually limited by the proscenium. However, screen height may also be limited in balcony houses by the maximum height that can be seen from the back row of the main floor where the sight line is eclipsed by the overhang of the balcony. In this case it may be necessary to use a screen aspect ratio of 2 to 1.

For houses with smaller screens where the width is limited to 30 feet, but where there is plenty of height, an aspect ratio of 1.66 to 1 is suggested. In the latter case, picture height can be reduced when necessary for good viewing. In all cases the objective is to *fill* the screen with picture.

Screen Light Distribution

It has been found that some screens have been selected to give uniform distribution of light across the house. Our opinion is that such a screen tends to give an inferior picture at the center of seating and seldom improves the side seats.

For large theatres we suggest a metalized seamless screen that has a light gain of 2½ to 1. This type will give much better viewing to the important and largest number of seats and will provide satisfactory light distribution throughout the theatre. Further, the screen should be curved in a radius equal to the production throw.

In long narrow houses the radius could be increased to 1¼ to 1½ times the throw. In addition, where the theatre has a high projection angle, excellent results are obtained by tilting the screen back slightly at the top about ⅓ the projection angle, but not more than 5 degrees.

Paramount Studio Tests

Tests made at the Paramount Studio in Hollywood were shown on a Stewart Trans-Lux Luxuria seamless screen measuring 62½ by 33⅓ feet on which a picture 61 by 33 feet was projected. This was the 1.85 to 1 ratio with a projection throw of 165 feet.

Such a screen could be fitted in only a few houses, but it served to demonstrate the possibilities of clarity, depth of focus, and resolution. On it a VistaVision-produced picture appeared brilliant, with excellent light distribution throughout the house. An improvement was noted too with pictures made on the old standard. They were noticeably better even in the 4 by 3 size.

It can be said, therefore, that where an exhibitor is about to make an outlay for a new screen, we feel that it is wise to invest in a good quality seamless screen. Another reason is that seams tend to divide and separate the picture and become an annoying distraction after awhile.

A new screen of the seamless type will add much to the enjoyment of the patrons.

Proper Method of Splicing CinemaScope Film

By IRVING MERKUR

Ace Electric Manufacturing Co.
Member, IA Local 306, New York City

AT the last meeting of the 25-30 Club of New York City I offered my views on the topic of the proper splicing of CinemaScope film, regarding which there has been considerable comment in projection circles. Appended is a digest of the open, and rather rugged, discussion which ensued at this meeting.

I introduced at this meeting the Griswold "Hot" splicer which I regard as essential for the proper splicing of present-day acetate film. I used Jefrona cement in this demonstration, but I am confident that, with the proper procedure, any good cement will produce equally satisfactory results. I regard the use of a heater element as essential for the satisfactory splicing of acetate film.

Proper Procedure

For safe splicing I recommend the following procedure:

First, place the film in the splicer right-side-up and then cut in the usual manner. Remove the film from the right side of the splicer. Then reverse the film and place it on the left side of the splicer with the magnetic track facing upward.

Next, apply a thin coating of cement to the magnetic side of the film. Let this "set" for at least ten seconds; then carefully wipe off any excess cement. This will remove the magnetic coating and gloss.

For the next step, remove the film and replace it on the right side of the splicer, following which replace the film which was on the left side. Scrape this piece of film dry with the Ace scraper and apply a thin coat of cement. Then close your press plates — and the splice is made to hold securely.

Is is absolutely essential to let the completed splice rest within the press plates for a minimum of 1 minute — *never less.* This gives the cement a chance to penetrate the film and to dry properly. *Never,* under any circumstances, try to squeeze out the cement from the splice, because this will cause the magnetic coating to smear.

Basic Splicing Requisites

The following rules are essential for the making of a good splice for any type of film:

1. Scraping must be clean and not deep.
2. No water should be used.
3. Cement must be applied evenly and sparingly.
4. A good splice will always be made if you raise the left-side plates and apply the cement to the film. Never apply cement to film while it is resting on the cutting bar, as this will cake your cutting edge and make it impossible to get a clean patch.

Many projectionists have experienced difficulty with the splicing of CinemaScope film, and I should appreciate it if any questions arising from this difficulty be submitted to IP.

THE LENS: Key to Projection Quality

Problems that result from the use of fast modern lenses and lenses of short-focal length are described in this third and concluding article of a series. Considered also is a step-by-step procedure for the care and cleaning of projection lenses.

By ROBERT A. MITCHELL

IF WE double the width of a screen-image by halving the focal length of the lens (using a 2½-inch lens in place of a 5-inch lens, for example), the area of the projected picture is increased 4 times. This means that 4 times *more* light is needed to get the same picture-brightness with the 2½-inch lens as was obtained with the 5-inch lens, the speeds of both lenses being the same. This consideration is often overlooked: the exhibitor who buys new short-focus lenses fails to buy new lamps of suitable power to go with them. And the purchase of new lamps usually also entails the purchase of new generators or rectifiers.

Brightness Comes First

This reminder is not meant to discourage the use of shorter focal-length lenses, *but* adequate screen illumination should never be sacrificed for mere picture-bigness. And as slow, rather than fast, lenses in the extremely short-focal lengths are recommended for better image-definition, the need of suitable lamps to accompany the new lenses is all the more urgent.

Specifically, slow and medium lens-speeds (F:3 to F:2.5) are best in the 1½-inch to 3¾-inch focal lengths, fast speeds (F:2 or F:1.9) in the 4-inch and greater focal lengths. Theatres contemplating a change from 5-inch to 4-inch lenses (to increase picture-width from 14.9 feet to 18.5 feet at a 90-foot throw, for example), should obtain coated 4-inch lenses of F:1.9 speed. If the old 5-inch lenses were slower than this, and not coated, new lamps may not be necessary, as the new picture-area is only 1½ times the old area. It depends wholly on whether the lamps gave adequate light with the old lenses.

Coated Lenses

Coated lenses transmit much more light than uncoated ones — 15 to 25 per cent more light. This substantial gain is augmented by the increased speed which can be obtained in modern lenses. All too often, however, the advantages of coated projection-port glasses are overlooked. When both surfaces of these glasses are coated, a gain of about 10 per cent in screen-illumination is obtained. In addition to this positive boost of picture-brightness, coated port glasses assist in the production of more sparkling and lifelike image-contrasts.

The "F-number" speed of a lens is found by dividing its equivalent focal length (E.F.) by the diameter of the "pupil," or clear opening through which light may pass. As an example, a certain lens has an E.F. of 4 inches and an opening of 2.1 inches in diameter. Its speed is F:4/2.1, which equals F:1.9.

Arc Mirror Speed

Theoretically, a lens will intercept all of the light passing through the projector-aperture when its speed matches that of the arc-lamp mirror or condensing lens. We say "theoretically" because the "theory" usually fails to include a mighty important factor, namely, the size of the aperture.

The true optical speeds of arc mirrors and condensers are extremely rapid (in the neighborhood of F:0.4), and are not used in lens-matching calculations. Instead, the mirror is regarded as a lens which images upon the aperture a luminous positive crater placed *infinitely far* behind the mirror! The "working distance" (distance from center of mirror to aperture) then becomes *virtual* focal length. On this assumption, the *virtual* speed of a 12-inch mirror removed 30 inches from the aperture is F:30/12, or F:2.5.

We are allowed to make this assumption because the distance from positive crater to mirror-center ("geometric focus") does not affect the angles of the light-rays when the system is in focus (that is, when the crater is accurately imaged upon the aperture as a brilliant "spot").

All this is simple enough; and such a mirror (virtual speed of F:2.5) will be perfectly matched by an F:2.5 projection lens *if the aperture be a*

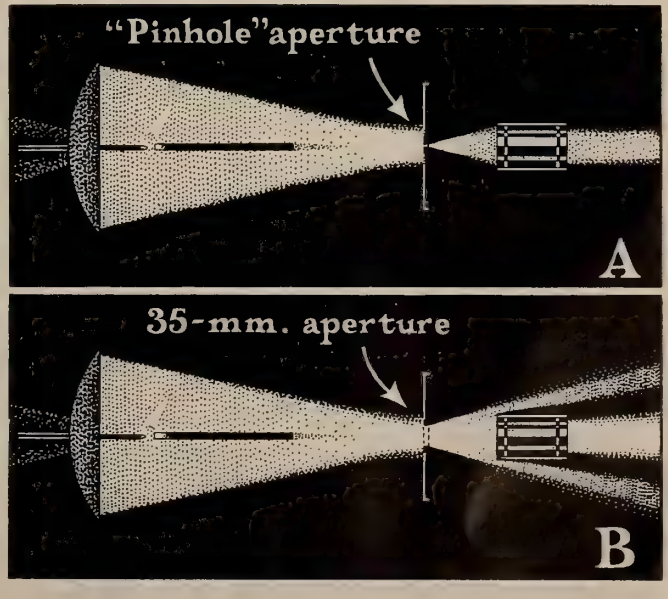


FIGURE 2.

The mirrors and lenses illustrated here have the same "speed"—F:2. The lens in (A) matches the mirror perfectly, but not the lens in (B). The difference is due to the different sizes of the apertures—the larger the film aperture, the faster the lens must be to capture all of the light and thus match the mirror. In actual practice, therefore, an F:2 lens is too slow to match an F:2 mirror.

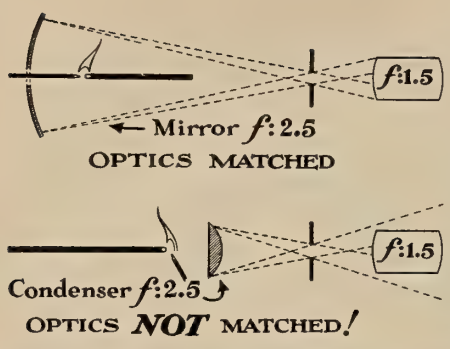


FIG. 3. The closer it is to the aperture, the smaller a mirror or condensing lens must be to have the same speed as a mirror placed farther away. Because of differences in the relation of the size of the aperture to that of the lamp-mirror or condenser, a projection lens which matches one mirror or condenser does not necessarily match another having the same speed.

mere pinhole of infinitesimal dimensions. But projector apertures are not mere pinholes: they are rectangular openings of appreciable size! Here is where we encounter difficulties.

Figure 2 shows how the light spreads out as it emerges from (A) a pinhole aperture and from (B) an actual 35-mm film-aperture having a diagonal of about 1 inch. Notice that the F:2 lens *does not* match the F:2 mirror in the case of a real aperture because there is too much "spreading" of the light rays. The outer rays miss the lens entirely. Therefore, the lens must be *faster* than F:2 if it is to match an F:2 mirror!

Condenser Speed

There is still another peculiarity that appears when we are dealing with real apertures. Condensing lenses, as all projectionists know, are much closer to the aperture than are mirrors. To have the same virtual speed (working distance divided by diameter), a condensing lens need not be nearly as big as a reflector. And regardless of what the working distance may be, an F:2.5 condensing lens matches an F:2.5 projection lens (just as an F:2.5 mirror does) *if the aperture be only a tiny pinhole.*

With a 35-mm film-aperture, however, the small F:2.5 condenser produces a greater spreading of the light-rays from the aperture than does the larger, but more distant, F:2.5 mirror! This is because the diameter of the condenser divided by the diagonal of the aperture is a smaller number than the diameter of the mirror divided by the diagonal of the aperture. (See Fig. 3.) Hence the surprising conclusion: a condenser requires a faster lens for perfect optical match than does a mirror *having the same speed!*

Matching Optics

At this point we seem to be hopelessly entangled in optical complications. Is it possible to calculate the speed of a lens required *to match perfectly* any lamp-mirror or condensing lens? It is possible to do so, most assuredly; though the formula is a bit complex. But before examining this formula, let's review the definition of perfect optical match.

A state of optical match between projection lens and lamp optics exists when the lens has sufficient speed to intercept all of the light emerging from the aperture.

The matching formula which gives the F-number of the lens *(f)* required to match the lamp-optics is:

$$f = \frac{Fm}{bF + a(F + m)}$$

in which *a* is the aperture-diagonal (1 inch), *b* is the diameter of the mirror or condenser in inches, *F* is the E.F. of the projection lens in inches, and *m* is the working distance of the mirror or condenser in inches.*

A complete explanation of this formula and its mathematical derivation may be found in the October 1949 issue of IP, beginning under the heading *The Efficiency Ratio* on page 8.

Although this formula is absolutely correct for simple, single-element projection lenses, and extremely accurate for actual lenses consisting of several elements, its practical value consists solely in revealing that projection lenses must be even faster than the most rapid lenses now available to match perfectly ordinary projection lamps. (See Tables A and B on p. 9 of IP for March 1949.) We may now ask: are the extremely fast lenses needed for perfect optical matching really desirable? No, they certainly are not!

* The distance from mirror (or condenser) to aperture. In the case of a mirror, **m** in this formula is the length of a straight line **parallel to the optical axis** drawn from the edge of the mirror to the **plane** of the aperture. In other words, the mirror is treated as a flat disc instead of the concave surface it really is.

Depth of Focus

It has been shown that fast lenses have a smaller depth of focus than slow lenses. The extremely fast lenses demanded by the perfect matching would be so sensitive to film-flutter and buckle that good focus would be absolutely impossible. The most rapid lenses now available (F:1.9) represent the limit of practicability.

However, when the lens fails to match the optics of the lamp — and this is practically always the case — light is lost and a certain amount of "vignetting," or fadeaway of light at the edges of the picture results. This is one of the causes (but by no means the most important one) of the "hot-spot effect" — a bright central area of the projected picture with fade-away at the edges.

Rays from the edge-zones of a fast mirror diverge so rapidly on the lens-side of the aperture that they may miss the lens entirely, especially when passing close to the edges of the aperture. Rays from the central zone of the mirror, however, are intercepted and utilized by the lens. This makes for hot-spot projection and also increases film-buckling because, whether the rays reach the lens or not, they pass through the film and increase its temperature.

One way to attain optical match without increasing the speed of the lens is to decrease the speed, or diameter, of the mirror. In other words,

(Continued on page 32)

You Can't Stretch Light!

If we double the width of a screen-image by halving the focal length of the lens (using a 2½-inch lens in place of a 5-inch lens, for example), the area of the projected picture is increased 4 times. This means that 4 times more light is needed to get the same picture-brightness with the 2½-inch lens as was obtained with the 5-inch lens, the speeds of both lenses being the same. Adequate screen illumination should never be sacrificed for mere picture-bigness.

Polaroid-IP Contest Winner:

GEORGE A. HARTNETT

Member IA Local 286, Des Moines, Iowa

FIRST prize in the final round of the Polaroid-IP Contest for the best suggestions relative to improved projection of 3-D pictures was copped by George A. Hartnett, member of IA Local 286, Des Moines, Iowa, who conceived and put them into practical operation at the Des Moines Theatre in that city. Hartnett scored over some 60-odd entries.

A Polaroid Land Camera is now being shipped to Mr. Hartnett, who won despite stiff competition from Thomas Cromer, 632 C Ave., West Columbia, S. C., IA Local 347, and John J. Brown, Paramount Theatre, Moncton, N. B., Canada, who were named for honorable mention by the judges, Lewis W. Chubb, research physicist for the Polaroid Corp., and the editorial staff of IP.

Practical Operating Tips

Hartnett was declared the winner on the basis of three suggestions made in his letter. While not spectacular individually, the suggestions cumulatively are practical and very useful ideas for coping with the special problems of 3-D projection.

One Hartnett suggestion is to utilize the support rod which is now installed over the lens, of many projectors to support the weight of the CinemaScope. It was suggested that this rod can be adapted to hold polarizing filters. Another proposal is to fasten polarizing viewers to the front of a pair of small field glasses as an aid in focusing 3-D. The third idea describes a method of unloading oversize reel cans that lessens the danger of strain or injury.

Here is Mr. Hartnett's winning entry:

The following three suggestions for your Polaroid-IP 3-D Contest have been practically applied in our projection room with very satisfactory results.

(1) 3-D Filters

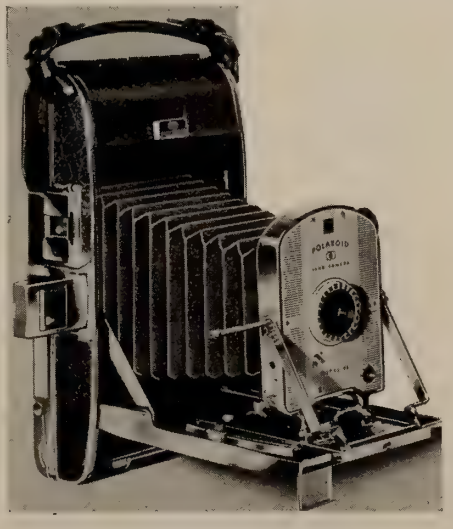
On the front of our Simplex XL projectors are half-inch rods which are located above the lens and extend forward about nine inches. On the front of our CinemaScope lens, which is 19 inches long and quite heavy is a band or collar supporting a roller which rides on this rod and supports the front end of the lens.

Now, when the lens holder screw in the projector is loosened, and with the projector set at an angle, the whole lens assembly would roll forward and right on out the porthole unless held very firmly, a rather difficult thing to do.

To avoid such a mishap, we fashioned two collars out of some old gears which happened to be the right size, grinding off the teeth to make a collar. Fitted with a thumbscrew, the collar may be fastened firmly to the rod up against the roller, holding the lens securely while the back lens holder screw is loosened.

Now here is how we put this to work to hold our 3-D filters. We made another pair of the collars and to them we fastened our 3-D filter holders. This may be done with glue, solder or small machine screws. The collar is then slipped on the rod, the thumbscrew tightened to hold the filter level and at exactly the same angle as the projector and lens.

When not needed, a quarter or half turn throws the filter up out of the way, where it can be held by tightening the screw and can immediately be flipped again into position for the next 3-D reel. In this way the filter is never dropped or mislaid and is always handy when needed. The assembly may be easily slipped off for cleaning and quickly replaced or stored away until needed again.



Polaroid-Land camera

(2) 3-D Focusing Aids

Because of the double images, maintaining sharp focus is a problem with 3-D. Closing one eye in order to see only one picture does not work well in many cases, and hanging a spare filter in the lookout port also has disadvantages. We purchased two pairs of opera glasses. Over the front lenses of one pair we fitted two of the "left" filters carefully cut from a pair of polarized viewers. We attached the two "right" filters to the other pair. By using the opera glasses with the "left" filters, it is possible to get a closeup of only the left picture, making focusing quick and easy. The other pair of opera glasses is used for the right picture.

(3) 3-D Reel Storage

When attempting to lift a 5,000-foot, 3-D reel from a large film can when it is standing upright, it is often difficult to get a firm grip on the reel and many times it will slip and drop back into the can or onto the floor, resulting in a broken or badly bent reel. I know of one projectionist who dropped such a reel can on his foot, breaking his big toe.

A very simple solution is to lay the large reel can on its edge. The lid will act as a door, easily opened and closed. The reels may be very easily rolled out of or into the cans and can be grasped firmly for carrying to the projector.

IP regrets that this Contest could not be extended for a longer period of time no less than the fact that many of the splendid suggestions received could not have earned an award. It feels, however, that the ideas advanced have been of much benefit to the craft.

Stewart-TransLux Seamless Screen

Increased interest in "seamless" screens as opposed to the types with visible seams joining either horizontal or vertical panels is reported by the Stewart-TransLux Corp., New York, which manufactures large seamless screens, suitable for CinemaScope or other wide screen processes.

The "Luxuria" screen, manufactured by Stewart-Trans-Lux, can be obtained in sizes up to 50 feet high and 90 feet long. These screens are completely perforated to conform to any type of sound system the exhibitor wishes to use. The plastic screen is said to have less tendency than fabric to absorb sound, making possible more efficient sound transmission.



Now all seats are

Watch an audience, as one of today's wide-screen romances unfolds. There's a new feeling of reality—a new sense of being right in the midst of things. And everyone in the house shares it. All of this comes from combined new technics in picture-taking, processing and projection—problems which the Eastman Technical Service for Motion Picture Film is helping the industry solve. Branches at strategic centers. Inquiries invited.



down front!

Address: Motion Picture Film Department
EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

East Coast Division
342 Madison Avenue
New York 17, N. Y.

Midwest Division
137 North Wabash Avenue
Chicago 2, Illinois

West Coast Division
6706 Santa Monica Blvd.
Hollywood 38, California



Now all seats are down front!

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East Coast Division	*Midwest Division*	*West Coast Division*
342 Madison Avenue	137 North Wabash Avenue	6706 Santa Monica Blvd.
New York 17, N. Y.	Chicago 2, Illinois	Hollywood 38, California

IN THE

SPOTLIGHT

FINALLY and conclusively the motion picture business has come home — technologically speaking. So long ignored, the very existence of the motion picture business today depends upon the ultimate delivery of the finished product into which has been poured the creative talents of the writer, the producer, the cameraman and his technical associates on the set.

Now, then, comes the financially fateful moment — the final delivery of the finished product to the public which picks up the tab for all the manifold activities of the industry. Simply expressed, this means the box-office.

Time was when the executive studio personnel in Hollywood, while quite aware of the results of the fourth race at Santa Anita, were utterly unaware of what was happening to their product in those outlets, large or small, Broadway or the crossroads, which exercised a profound influence upon their very existence. In effect, they are not confronted with the, to them, dismal spectre of coping with that factor which had never even occurred to them previously — technology.

Now begins the hustle and bustle. Now the grim necessity for facing reality. What is this strange factor, previously ignored, which threatens their empirical status? It is the, to them, depressing but vital necessity for translating at the box-office their so-called "art" into dollars which will ensure their economic survival.

If there be any element of executive sanity left in this industry, *with particular reference to production and exhibition standards*, when will it be exercised?

• Wilfred H. Spicer, member of Local 300, Saskatoon, Canada, makes some very interesting comments in this month's "Letters to the Editor" department about the early days of motion picture exhibition. Spicer is one of the real old-timers in the craft. He started "cranking" machines back in 1908 and spent many years trouping all over the United States and Canada showing pictures in Kinemacolor — the first colored movies shown.

• The 42nd Convention of the IATSE will be held in the Music Hall, Cincinnati, Ohio, during the week beginning August 9 next. Convention headquarters will be at the Netherlands Plaza Hotel.

• Albert S. Johnstone, president of New Orleans Local 293, was appointed 7th IA vice-president, and William Donnelly, business representative of Minneapolis Local 13, was named 8th IA vice-president, to fill the two vacancies caused by the deaths of vice-presidents Roger M. Kennedy, Detroit, and Felix D. Snow, Kansas City. The appointments were made by the IA General Executive Board at its recent semi-annual meeting.

• The New York State Association of Motion Picture Projectionists will hold its 1954 Spring meeting on Monday, May 10 at the Moose Club, Hornell, N. Y. At the close of the Association's business sessions, Hornell Local 676 will celebrate its 25th anniversary at a dinner-dance in the ballroom of the Club, to which all the delegates and their guests are invited.

• Minneapolis Local 219 reached a compromise settlement with subsequent-run houses on the issue of pay for preparatory time in the showing of CinemaScope features. The projectionists will be paid for 30 minutes preparatory time, the same as in the first-run houses. Originally the Local had asked for 45 minutes extra time, thus the settlement appears to have been very advantageous for the Local.

• Walter E. Bryner, charter member of Local 323, Springfield, Ill., was presented with a gold life membership card at the Local's recent 40th anniversary celebration.

• Local 434, Peoria-Pekin, Ill., was awarded a judgment of $785 in its suit against Harry C. Runyan, operator of the Luce Theatre in East Peoria. The judgment covers a promissory note held by the Local for $750, plus interest.

• Hartford Local 84 sponsored a two-hour vaudeville revue, headed by Jan Murray, radio and Tv star, the proceeds of which went into its welfare fund. Charles Obert, president of the Local, and Rube Lewis, business representative, were co-chairmen in charge of the affair.

• The officials of Local 287, Beaver Falls, Penna., are negotiating with drive-in theatre owners for a new contract which includes a provision for pay for 15 minutes preparatory time for the projectionists.

• Local 646, Ft. Lauderdale, Fla., has set up a nightly picket line in front of the Fox Drive-In Theatre in nearby

How To Kill A Union

1. DON'T attend meetings.
2. If you do attend, arrive LATE.
3. If the weather isn't pleasant, stay HOME.
4. DON'T accept any office — it's easier to CRITICIZE.
5. NEVER approve anything your Officers of Committees do.
6. DON'T pay your dues until you have to.
7. INSIST upon official notices being sent to you, then DON'T pay any attention to them.
8. DON'T waste any courtesy at a meeting, it's up to your officers to take it.
9. When you DON'T like what's going on, say so, but under no circumstances offer any constructive suggestions.
10. Devote most of your time TALKING; let someone else do the work.
11. Look for hidden motives; DON'T credit Brother Members with any ideals.
12. DON'T co-operate with any Officer of Committees, make them co-operate with you.
13. Remember YOU know more than anyone else about everything. If THEY don't agree with you, THEY ARE WRONG.

Labor News, Worcester, Mass.

Oakland Park, as a result of the management's refusal to employ union projectionists. The Fox-Drive-In is the only theatre in the Local's jurisdiction not employing IA men.

• A compromise settlement between Vancouver Local 348 and Canadian Famous Players was reached several weeks ago after many months of negotiations. The theatre circuit acceded ot the Local's demand for a wage increase of 25 cents per hour, with most of this increase going into a welfare-pension fund. The Local agreed to the conversion of 10 Famous Players theatres in the province from the two-man to the one-man shift.

• The AF of L Union Industries show which was held several weeks ago at the Pan Pacific Auditorium in Los Angeles drew a record-breaking crowd. The exhibit, staged by the Union Label and Service Trades Department, was officially opened by William F. Schnitzler, AF of L secretary-treasurer.

• Now that Armando Gonzales, member of Corpus Christi Local 604, is the possessor of one of the famous Polaroid-Land cameras which he won for the best contribution in the Pola-



Armando Gonzales, member of Local 604, Corpus Christi, Texas, prize winner in the Polaroid-IP 3-D contest

roid-IP 3-D contest for February, he can add still photos to his hobbies of radio and 8-mm movies. Gonzales, who is 27, has been a member of Local 604 for the past six years and works as projectionist at the Texas Theatre in Kingsville.

• The Hollywood AF of L Film Council has gone on record officially as opposing foreign production of motion pictures by American producers who go abroad to take advantage of cheap labor. It has called upon the U. S. government to use its influence in negotiations with foreign film in-

George J. Flaherty, business representative for Local 165, Hollywood, Calif., has been appointed West Coast representative for the IATSE. He succeeds Roy M. Brewer, who resigned last September. Flaherty has long been active in union affairs and is highly regarded in IA West Coast circles.

dustries "in order to equalize the bargaining power."

Among the IA Locals participating in the Hollywood AF of L Film Council are Studio Projectionists Local 165, Cameramen's Local 659, Laboratory Technicians Local 683, Sound Technicians Local 695, Film Editors Local 776, and Studio Cine Technicians Local 789.

• Last month, in these columns, we mentioned that Nathan D. Golden, director of the Scientific, Motion Picture and Photographic Products Division, U. S. Department of Commerce, was an *honorary* member of Cleveland Local 160. A note from Nat, however, sets us straight on this matter, to wit: "I am not an honorary member of Cleveland Local 160; I am proud to say that I am a regular card-carrying member of that Local." Okay, here you have it.

Incidentally, Golden is now in Cologne, Germany, representing the Department of Commerce at "Photokina 1954," which is the International Photographic Trade Fair and Show.

• *25-30 Club Highlights:* The unusually large turnout which marked the April 8 meeting of the 25-30 Club of Greater New York was due in large measure to the scheduled appearance of Richard M. Altman, optical engineer with the Bausch & Lomb Optical Co., who addressed the gathering on the subject of CinemaScope and the anamorphic lens. At the conclu-



Irving Merkur, member of Local 306, demonstrated at a recent 25-30 Club meeting how to properly splice CinemaScope film with the new Ace-Griswold "hot" splicer

sion of the lecture, Altman and Andy Scheick, B & L's New York representative, held a question and answer session which the members found very interesting and informative. The stereopticon machine used to illustrate the talk was operated by Joe Abrams, member of the Club . . . Tickets for the Club's June 10 dinner at the Grand Street Boys Clubhouse in New York City have been selling like hotcakes. This will be a gala night and many surprises are in store for the guests. Tickets will have to be purchased in advance, as none will be sold the night of the party.

IA OBITUARIES

WAYNE E. SWANK, SR., 55, president of Local 521, Long Beach Calif., died March 27 from a prolonged illness. A member of the Local for the past 32 years, he served in many official capacities. For the past



The late Wayne E. Swank who was a member of Local 521 and its president at the time of his demise.

20 years he had been employed as projectionist at the United Artists Theatre. Wayne was highly regarded by his brother members and his many friends throughout the Alliance. He is survived by his wife, Ruth; a son, Wayne E. Swank, Jr., also a member of the Local, and three sisters.

ROGER M. KENNEDY, 62, IA second vice-president and business representative for Detroit Local 199, died March 19 after a lingering illness. A native of Norwalk, Ohio, he began his career in the entertainment field back in 1906 by working as a projectionist at the old Comique Theatre in Columbus. In 1910 he became of member of Local 194, Indianapolis, Ind., transferring to Detroit Local 199 in 1913. He was elected vice-president of the Detroit Local in 1919, president in 1920, and business representative in 1921, holding the latter office almost continuously until his retirement early this year.

GEORGE H. GOODRICH, 66, member of New York Local 306, died March 23. At the time of his death he was employed at the 8th Street Playhouse in New York. He is survived by his wife and three sons.

SHERIDAN "SHERRY" MCAULEY, 65, member of Local 225, Atlanta, Ga., died in a local hospital on March 14. He worked at the Rialto Theatre for the past 15 years, retiring several months ago because of ill health. He was a veteran of World War I.

Brush-up on Fundamentals

Rectifiers for Projection II

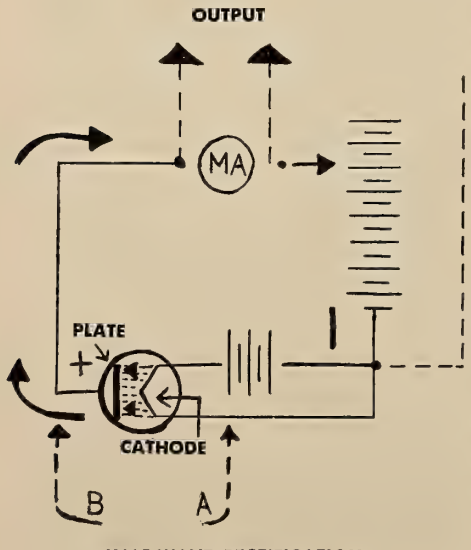
RIGHT NOW and before we get involved any deeper let's consider several questions. For instance, what's selenium? What's a vacuum tube? What's a diode? Most projectionists know the answers but for the benefit of the few who don't we'll let go with capsule definitions on each.

It's a "Valve"

Long ago it was known that if copper plates were heated, really hot till they glowed, then exposed to oxygen until well coated with copper oxide, the plates developed the curious property of letting a current of electricity proceed freely in one direction — and in one direction only. Then it was discovered that a substance, named selenium, if fused to one side of a metal plate in a thin coating, did the same job even better. Both, the copper oxide and the selenium-coated plates, provide the base for dry plate rectifiers.

Vacuum tubes, like all good cathode tubes, depend on thermionic conduction within the tube for their performance. In other words, if the negative cathode is heated it throws off electrons rapidly. Boils them off might be a better way of putting it — and doesn't let them come back. English electronic engineers have a more accurate word for "tube" than we have. They call a vacuum tub a "valve"— and that's precisely what it is. For a rough analogy, think of the valve of an automobile tube — it lets the air go in but won't let it out.

FIGURE 1



HALF-WAVE RECTIFICATION

Diode's Two Elements

Diode tubes have two internal elements, a cathode and a plate. When the cathode is heated by a low voltage (source A, Fig. 1) and the plate at a higher positive potential (source B, Fig. 1) with respect to that of the cathode, the cathode emits electrons which are attracted to the plate. The current flow is in one direction only, from the cathode, which is negative, to the plate, which is positive. This is easily shown by connection of a direct current milliammeter at point "MA" (Fig. 1.).

Since the above is true, if an alternating voltage (dotted lines, Fig. 1) is connected across the cathode and the plate, after the positive plate source "B" has been removed, electrons will flow between cathodes and plate only during that half cycle when the plate is positive. There will be no flow during the half cycle when the plate is negative. Under this condition a diode produces an output of *pulsating* direct current (Fig. 1). It becomes a rectifier converting alternating current to a direct current. However, since the current flows through the rectifier only during every *other* half cycle such a unit is known as a half wave rectifier.

Full wave rectification may be obtained through the use of two or four diodes when connected as shown in Figs. 2 and 3. (The heater source "A" is deleted for simplicity.) For these full wave circuits current flows *every half cycle* instead of for *every other half cycle* as in the case of half wave rectification. Many other connections are possible but the three illustrated with this article are sufficient for our immediate purposes.

Center Tap Rectifier

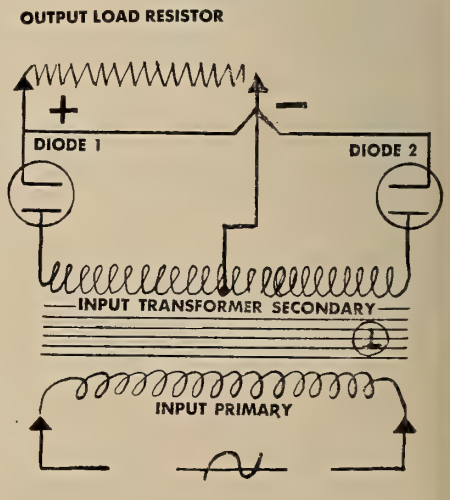
Let's take a look at Fig. 2. In this circuit two diodes are used. When the plate of Diode 1 is charged positively current flows through that tube, then through the load resister (sharp wavy lines) and back to the center tap of the transformer secondary. The positive half cycle for this condition cannot flow through Diode 2 at all since its cathode is positive this time instead of its plate. Thus no conduction can pass through the tube.

Now let's see what happens a tiny fraction of a second later. When the polarity reverses with the next half cycle of the alternating current the opposite end of the transformer secondary becomes positive. This places a positive potential on the plate of Diode 2 which then passes current on through the load resistor and back to the center tap of the transformer. Because of this momentary condition no current can pass through Diode 1 because this time *its* cathode is positive in respect to the plate. With this center-tapped transformer circuit both halves of an incoming cycle become rectified and full wave rectification is obtained.

Bridge Circuits

When the upper end of the secondary winding (Fig. 3) is positive, current flows through Diode 2, through the load of Diode 3, and through that diode returning to the lower end of the secondary winding. All elements are in series and, as the two diode plates receive the positive charge, they conduct. When the lower end of the secondary becomes positive, the condition is reversed. Diode 4 conducts, current passes through the load and impresses the positive charge upon the plate of Diode 1. It in turn conducts and the circuit is completed back to

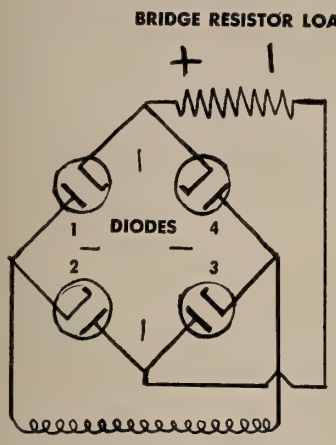
FIGURE 2



CENTER TAP RECTIFIER

the upper end of the secondary winding. Each pair of tubes, connected in series, carries half of the total load

FIGURE 3



FULL-WAVE RECTIFICATION

current. The resultant rectified waveshape is shown in Fig. 3.

Dry Plate Rectifiers

That "One Way Street" for electric current, just as described for diode vacuum tube rectifiers, may easily be obtained by the use of metallic oxide or dry plate rectifiers. These units can handle heavier traffic and are often substituted for diodes and the same basic circuits may be used. Previously we mentioned the copper oxide rectifiers. Now we'll go into the selenium rectifiers and see what makes them click. The basic elements and one method of assembly are described below.

Aluminum base plates are chemically etched and then electro-plated with a very thin coat of nickel. Highly pure and finely powdered selenium is sprinkled over *one* side of the nickle-plated base plate which is then subjected to a high temperature while under considerable hydraulic pressure. The pressure causes the selenium to adhere to the base plate and starts crystal nucleation. The selenium cell thus formed is oven-baked for crystalization whereupon the selenium is converted to metallic form. This heat treatment forms a very thin oxide barrier on the selenium which acts as a one-way valve during ultimate rectification.

Alloy Over Barrier Surface

A low melting point alloy is sprayed over the barrier surface to serve as a contact for circuit connection. Application of the alloy completes a single rectifier cell which can handle approximately ten volts (varying with the size and type of the unit). For a given unit to handle higher voltages blocking action is increased. This is accomplished by subjecting cells to voltages great enough to cause current to flow in a reverse direction, against the barrier. This electro-forming process requires several hours and stabilizes the final cell for one-way conductivity and blocking characteristics. In final form, then, a selenium rectifier is composed of two metals separated by a semi-conducting barrier.

For heavy duty requirements, such as theatres, cells are stacked and bolted tightly together. These stacks should never become loosened. Series contact from cell to cell requires tightness. Although rugged, these rectifiers should never be subjected to severe physical shock.

[TO BE CONTINUED]

CinemaScope On 102-Foot Drive-In Screen

ONE of the really significant developments in connection with the introduction of the various new projection processes was the installation in the past month of CinemaScope equipment at the Motor Vu Drive-In Theatre in Salt Lake City. This drive-in theatre is now projecting "The Robe" on a screen which is 102 feet wide and 48 feet high.

The entire installation operation was supervised by Service Theatre Supply, Inc., Salt Lake City, with Motiograph representatives participating; while the stereophonic sound installation, the first ever to be made in a drive-in theatre, was handled by Altec Service Corp. engineers.

Two Ashcraft jet-controlled Super-Power projection lamps are used at the Motor-Vu, and according to Harry Swonson, of Service Theatre Supply, despite the difficult problems involved the picture image now being shown is as good as, if not better than the old image which was 70 feet wide by 48 feet high.

Projection Equipment Used

Two speakers are provided for each car, one hooked to the left side of the car and the other to the right in order to provide a stereophonic effect. The screen is faced with Johns-Manville ¼-inch thick Flexiboard which was given 3 coatings of white Raytone Drive-In theatre screen paint.

In view of the many projection problems that had to be solved in making this installation, the following listing of the projection equipment used may be of interest: two Motiograph AAA projectors; one pair of CinemaScope anamorphic lenses; one pair of Kollmorgen wide-angle lenses; one Robin Imperial 25-horsepower motor generator; two Ashcraft projection lamps, as previously mentioned; two Motiograph penthouse soundheads; two transformers; one pre-amplifier with combining networks; two glass heat filters; 11 film cabinets; 11 amplifiers, and 800 speakers.

Among the technical personnel present for the installation were Frank Riffle and Charles A. Moore, sound technicians from Motiograph.

A subsequent installation of CinemaScope and stereophonic sound equipment was made at the Sky-View Drive-In in Augusta, Ga. The Sky-View's screen is reportedly the world's largest, measuring 120 feet wide by 50 feet high, with the equipment being practically identical with that installed in the Salt Lake City job.



Screen used for the first CinemaScope drive-in presentation at the Motor Vu Drive-In Theatre, Salt Lake City. Enormity of screen, 102 by 48 feet, may be gauged by comparing its range with human figures shown at lower left.

What's Your Problem?

Projectionists whose problems appear below will each receive a $5.00 check from IP. We'd like to know "what's YOUR problem?"

QUESTION: *My theatre will shortly install CinemaScope. I should like to know if there is some reasonably easy method of calculating CinemaScope picture and lens sizes.*

PEDRO ARMANDEZ, Los Angeles, Calif.

ANSWER: There are two approaches to this problem. The first is desirable for making calculations in older theatres where it is not advisable to try to use the projection distance for determining CinemaScope picture and lens sizes. It is very difficult to measure the distance from lens to the screen without appreciable error.

(Symbols used in the formulas below have the following meanings: W = width of CinemaScope picture; w = width of old regular-size picture; f = focal length of old regular-size lens; F = focal length of lens used for CinemaScope.)

For Older Theatres

If the size of the old picture and projection lens is known, width of the CinemaScope picture can be developed from the following formula:

$$W = w \times 2.21$$

If you intend to change the projection lens, and if the size of the new lens is known, you can find the width of the CinemaScope picture in the following manner:

$$W = \frac{w \times 2.21 \times f}{F}$$

To find the projection lens needed in conjunction with the anamorphic attachment for a given size CinemaScope picture, this formula may be used:

$$F = \frac{w \times 2.21 \times f}{W}$$

For New Theatres

At new theatres, where the exact distance from the projection lens to the center of the screen is known, the same information can be obtained a little more easily by the use of slightly different formulas.

(The symbols used in the formulas below have the following meanings: W = width of the CinemaScope picture; D = distance from the projection lens to the center of the screen; F = focal length of lens; H = height of the CinemaScope screen.)

To find the width of the CinemaScope picture if the size of the projection lens and projection distance are known, use this formula:

$$W = \frac{D \times 2 \times 0.912}{F}$$

To find the size of the projection lens needed for a *given* width of CinemaScope picture at a *given* projection distance the following formula may be used:

$$F = \frac{D \times 2 \times 0.912}{W}$$

The height of a CinemaScope picture at *zero* angle of projection is determined as follows:

$$H = W \times 0.392$$

QUESTION: *I wonder if it would be possible for you to give me an idea of what percentage of the 35-mm prints now circulating in this country are on the old nitrate base rather than safety film. By this I mean film that is produced by the motion picture industry for exhibition in theatres today.*

FRANK PEACOCK, Newburgh, N. Y.

ANSWER: It can be said definitely that there are no new films being printed on nitrate base in this country, and that any new release coming from a Hollywood studio would be on safety film base. When a nitrate-base print is received by a projectionist at the present time, it is usually a case where an old picture is being revived (something that is happening more frequently these days because of the shortage of new releases). Also, nitrate prints can be imported from Europe where the nitrate base is still frequently used. "Art" houses in this country receive many such prints.

Nitrate Print Circulation 1%?

Film manufacturers place the amount of nitrate film in circulation in the United States as low as 1% of all film circulating to theatres. It has been remarked that this is a dangerous situation because there is so little nitrate film around that many people who handle film may relax the constant vigilance required to protect workers and public so long as any amount of nitrate film is in circulation, no matter how small. *Always* look at the edge markings!



To the Editor of IP:

In the article "1954 Seen as Biggest Year for Color," by James Morris, in the January issue, the author mentions Kinemacolor. This is the first reference to that process I have seen in a long time. In the old days, I was on the road, all across Canada, and spent some time in New York showing Kinemacolor film. I though that, perhaps, some reminiscence and information might be of interest to projectionists.

Filter Color Composition

It was stated in the article that red and green filters were used. This is essentially correct; really the colors were blue-green and orange-red which were obtained by blending the three primary colors in equal proportions. During projection I used a strip of purple gelatine in the middle of the "red" filter to clear up the white. The general range of colors ran pretty true but the blue of a flag was never a true blue but always a blue-green.

The principle films in 1911 were the coronation of King George V in London, and at a later date the Indian Durbar at Delhi. Among the many subjects were "From Bud to Blossom" which showed the growth of flowers by a series of timed exposures, and "Choosing Wallpaper", where a lady is shown matching wallpaper to fabrics for home decoration, and many scenic films.

One-man Proposition

Trouping with Kinemacolor, although hard work and a one-man proposition, never got monotonous because of the multiplicity of difficulties to be overcome in the various theatres and halls which we played. The predominating trouble was electrical. Everything needed was carried, including a sheet metal booth with angle iron frame, which had to be bolted together. This was later replaced by a tubular framework which, when assembled, was covered with a heavy asbestos cloth. Also carried were over two hundred feet of No. 4 twin cable, about a dozen rheostats, and three motors, one 110 DC, one 110 AC and one 220 AC. Thus equipped, we were supposed to handle any electrical system from 500 DC down.

One problem was the amount of

"juice" required for the arc — at least 100 amps DC and better than 125 amps AC. If we got DC from the street car lines, as we did quite a few times, we had to use five rheostats in series and two or three in multiple series to obtain the necessary amperage. One lead of the 110-volt DC motor had to be plugged into the coils of the rheostat while the arc was burning to get the proper speed. With the heavy AC amperrage and one-inch carbons, the noise was terrible. The lamp was a vertical type and hand-fed. Closely watching the focus and feeding the arc at the same time meant keeping busy.

Regarding the Kinemacolor projector, in my opinion it was tops, and I have often wondered why it was never used for standard projection. During a program we used to run some standard film for variation by reducing the speed to sixteen frames per second and removing the color filter. We achieved a remarkably steady picture

WILFRED SPICER
Local 300, Saskatoon, Canada

To the Editor of IP:

I enjoyed your article on film damage in the February issue. Wouldn't it be possible to have more articles of this type which are of much interest to 2-D projectionists? After all, which is more important, 2-D or 3-D? True, you are trying to give projectionists as much information as you can on 3-D, but why overdo it?

I agree with the writer's theory on mutilation of film and the disregard some projectionists have for other projectionists. I couldn't swear to it, but I am quite sure the exchange from which we get our film seldom if ever inspects the film returned from theatres. Also, some inspectors don't know what the score is even if they do inspect it.

It couldn't be otherwise when leaders are patched out of frame or not patched on at the beginning of a picture. Several times the film has come out heads up with the soundtrack on the opposite side, so I have to rewind each reel twice.

ALBERT POWERS
Ashland, Kansas

[We refer Mr. Powers to the lead article in this issue in which we imply that 3-D will receive increasingly less attention, thereby placing new emphasis upon regular 2-D projection in future issues of IP.—ED]

Williams Screen Co. Expands

Added manufacturing space has been acquired by the Williams Screen Co., Akron, Ohio. A new plant on Kenmore Blvd. provides increased production facilities for the Williams all-purpose plastic silver screen.

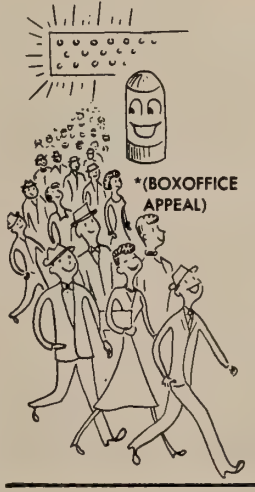


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Proper Projection Procedure For Re-Opening The Drive-In Theatre

On the sound premise that one needs not so much to be told as to be reminded, IP presents again the appended material which it published originally in April, 1949. These data are particularly appropriate now when feverish activity in terms of new processes is rampant in the drive-in field, particularly the new wide screens.

THE TERM "summer theatre" when used in connection with motion pictures denotes an exhibition operation providing screen entertainment during the summer vacation season. These operations may be divided into three main classes:

1. "Permanent" theatres which are operated only during the summer months because winter operation is unprofitable.

2. "Temporary" motion picture installations, among which are found open-air tents, concert halls, and dance pavilions pressed into service as cinemas.

3. Drive-in theatres.

Drive-in theatres are usually permanent in that the projection equipment is not removed at the close of the season. The "temporary" venture often employs motion pictures as a filler for open dates between concerts and stage shows. The "permanent" type of summer theatre is the most conventional, but the presentations consist largely of first-run, top-quality productions on single-feature bills with selected short subjects.

The operational policy, in general, is conservative and dignified.

Projectionists in most summer-resort theatres are required to close down at the end of the first evening show for an intermission — a convenience for waiting second-show patrons who find that a "preview" of the last few scenes of the feature picture spoils their enjoyment of the show. Starting times of shows are seldom delayed, except in the case of reserved-seat performances.

Reopening Tasks Formidable

A truly formidable number of tasks await the projectionist who must open a theatre which has been closed for a considerable length of time. To neglect any of them is to invite film breaks, light failures, and sound-system troubles. The skill, experience, and reputation of the projectionist are put to the test of preconceived standards from the outset. Failure to achieve acceptable screen results will discredit him. Ample time must be allowed to line up the projection and sound equipment prior to opening.

Certain legal aspects of such operations affect the projectionist and must be considered before anything else. No matter what the type of theatre, its projection facilities must meet the specifications of state and municipal ordnances. Examinations for projection licenses cover the following six points:

1. Handling of the head, lamp, appliances, and wiring of the projection equipment.

2. Practical testing for electrical defects in the lamp and wiring in the projection room.

3. Use of the safety appliances in the projection room.

4. Film-handling regulations.

5. Laws and regulations governing motion picture projection.

6. Projection demonstration in a theatre.

Legal requirements having been met, the projectionist is free to proceed directly to the equipment, and for this work a systematic, step-by-step servicing plan is helpful. It is only by exercising the utmost care in checking and lining up that the projectionist can be sure that all units have been covered thoroughly, and that the all-important opening show will run smoothly and with professional "snap."

The following suggested plan has been devised with the *very worst* conditions in mind. Specific instructions for checking various projector adjustments were outlined in "Notes on Projector Maintenance" (IP for August, 1948, p. 6), hence only the details of systematic inspection and servicing are treated at length in this article. The principal steps of the plan are numbered and headed to facilitate reference.

Inspection, Servicing Plan

1. PRELIMINARY CLEANING. *Do not switch projector motor on at this time!* Dust off the exterior surfaces of each projector, lamp, magazines, head, motor, and pedestal. Wipe the rust-preventive grease from all exterior and interior parts, and remove rust spots with a small cloth wet with kerosene. Dry thoroughly, apply a thin film of projector oil to the parts cleaned, and

Warning: Correct Width of Adjustable Shutter Blades

Shutters having blades of adjustable width need special attention. It has been stated incorrectly in a well-known textbook on projection that the lens may be about one-third open when the intermittent sprocket starts to move and the same distance open when the sprocket comes to rest, *without affecting the screen image.*

This inconceivably bad practice is advocated as an effective measure for increasing screen illumination.

Actual projection tests prove that the extra illumination amounts to only 2 or 3%—an amount imperceptible to the average eye. The really important effect, however, is the introduction of an annoying *rapid trembling* of the edges of all bright objects in the screen image.

We are forced to conclude, therefore, that the occulation of the film image must be positively of sufficient duration to keep the screen dark during the entire interval of the film movement in the gate. It is decidedly better to have the blades a trifle too wide than too narrow.

again wipe dry. (Do not use cotton mechanic's waste for cleaning projectors.)

2. Cleaning Drives and Gears. Attention will now be directed to the drive side of the machine. Remove excess oil from the mechanism and soundhead, using a medicine dropper to drain off oil pools; afterward clean rags. Scrub off accumulations of grime from the gears with a stiff-bristled toothbrush dipped in kerosene. Be sure to wipe the kerosene off afterward. Check all machine screws and taper-pins. This is the time to requisition gears and other parts which need to be replaced. *Do not oil the projector yet.*

3. Checking the Intermittent Test the intermittent sprocket for end-play and backlash when in the locked position. Note the "feel" of the mechanism when the machine is turned by hand. If there are no evidences of binding, the motor may be run for short periods. With the machine running, listen carefully to the intermittent movement *with the film gate open.* A noisy intermittent unit must be taken out of the head, carefully examined for wear, and adjusted for noiseless, rock-steady operation.

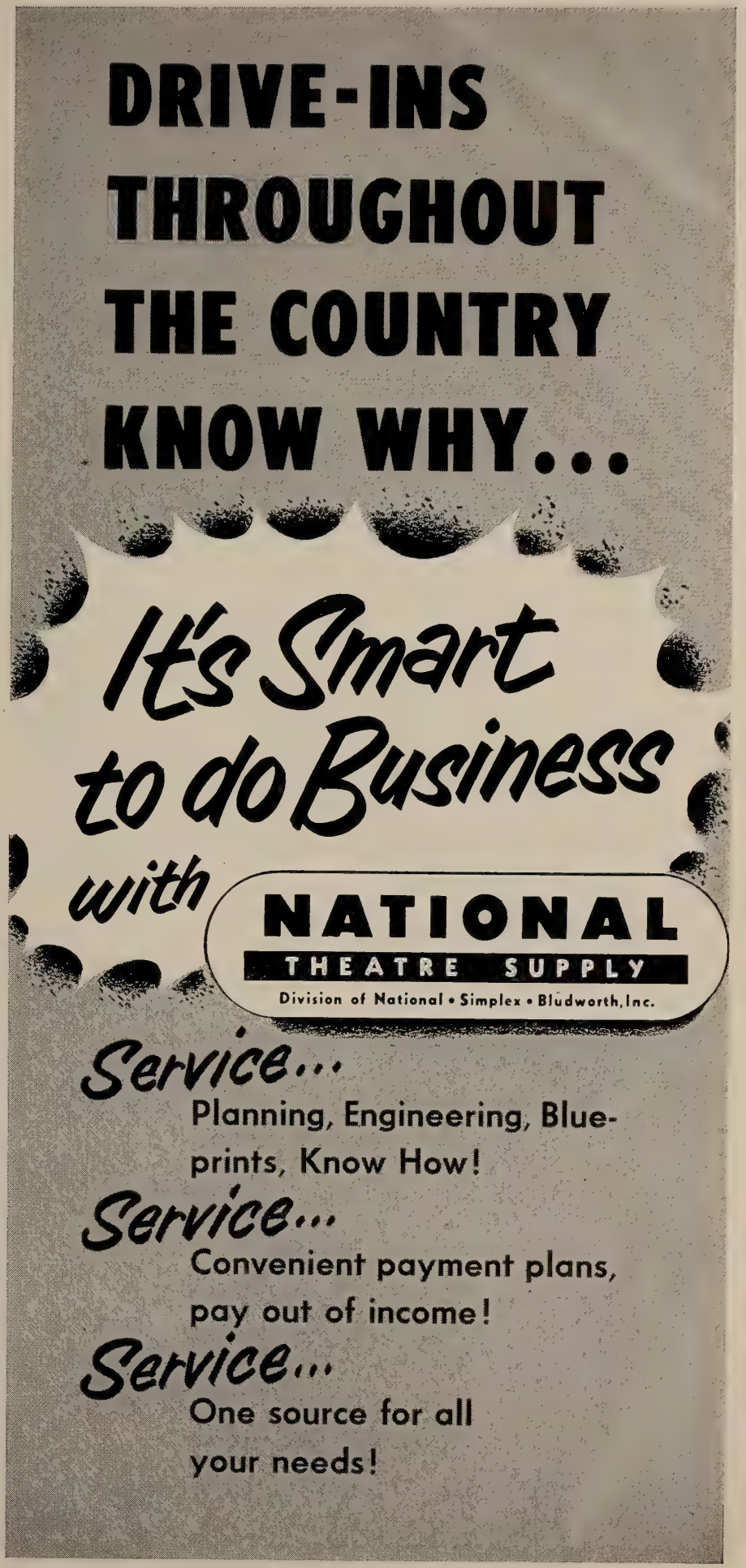
Checking Film Path

4. Checking the Film Course. Remove the upper magazine. Clean thoroughly all parts of the film side of the projection and sound heads, using kerosene as a cleaning agent. Carbon tetrachloride may be used to loosen stubborn dirt deposits. A quantity of clean rags, a toothbrush, and copper-wire probe are indispensable. The gate door, the aperture plate, and the projection lens should be taken out, and the lens carefully placed in the cabinet for cleaning at a later time.

Check all sprockets for worn or burred teeth. The intermittent and sound sprockets are likely to be the worst, as these are the most difficult to remove. Reverse or, better, *replace* sprockets having worn teeth.

Examine idlers and pad rollers for wear *and adjustment.* The lateral and clearance adjustments of pad rollers are sufficiently important to warrant a review of maintenance notes thereon.

Thread a short strip of new film over the sprocket. Open and close the pad roller several times rather sharply. Remove the film strip and examine its edges at the place where



it was on the sprocket. If an edge is found to be nicked or roughened, loosen the set-screw and move the pad-roller arm in or out, as required, and tighten. Repeat the test until a position is found where the edges of the film are not injured by opening and closing the pad roller.

Double-Film Test

Thread the sprocket with *two* thicknesses of film and close the pad roller. Adjust the stop-screw until the point is reached where the two thicknesses of film are only very slightly loose in the sprocket with the pad roller closed. Then tighten the locknut.

Clean the aperture plate and gate door, adjust the tension of the pressure pads, if necessary, and return these parts to the machine. A thin film of heavy petrolatum may be rubbed on the film tracks and pressure pads. (Oil should not be used in the gate, as heat will vaporize it and fog the lens.)

The gates of old-style soundheads and the takeoff drums of newer models may now be cleaned. Petrolatum is unnecessary here. The focus of the optical tube should not be disturbed if this is known to be correct. (More anon concerning this point.)

Check the alignment of the intermittent sprocket shoe by slowly closing the gate while the projector is running. If a loud intermittent sound is heard only when the gate is closed, adjustments are necessary.

Lateral Guide Rollers

Examine the lateral guide rollers for condition and cleanliness, but the adjustment of these must wait until the picture projection test is made. Clean and correct the position of sprocket strippers.

Finally, thread up a 10-foot length of film — preferably a strip containing several wide and badly buckled splices — and run down slowly *by hand*, noting the action of the loops and the passage of the film over the sprockets. Correct any faults which may be revealed by this test.

5. Upper Magazine. The upper magazine should be overhauled before replacement of the projector. Take the assembly completely apart, clean and oil the spindle shaft, then reassemble. Clean the fire-valve rollers. Put the magazine back on the machine in correct alignment with the head. Check the assembly by placing an empty 2000-foot reel in the upper magazine and turning it while pressing it on the edge of the reel. Scraping of the reel against any part of the magazine indicates a condition to be corrected.

Now test the tension of the friction spring by spinning a fully loaded 2000-foot reel in the magazine. The reel should not run too freely.

Magazine & Takeup Assembly

6. Lower Magazine and Takeup Assembly. It is highly advisable to service thoroughly the lower-magazine takeup assembly of any projector which has been idle for a considerable length of time.

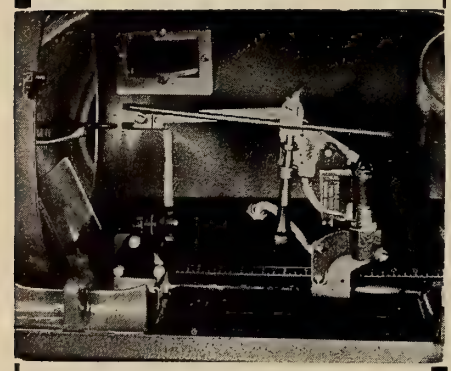
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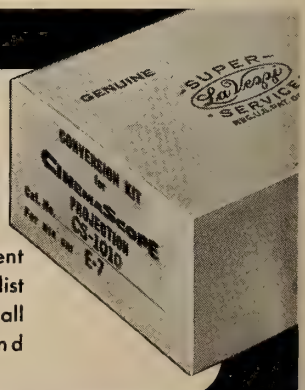
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one, if frayed and oil-soaked. Tighten takeup action. Replace belts having more than one splice or coupling.

Disassemble the takeup assembly. Inspect all parts for wear. Clean and oil the takeup spindle shaft. Scrub the clutch surfaces with carbon tetrachloride and *do not* oil them. Wash dirt and oil from the leather friction disk with carbon tetrachloride, dry thoroughly, *and oil only one side.*

Reassemble the takeup and adjust the tension to the correct degree. This may be done by placing a fully-loaded 2000-foot reel of film in the lower magazine and switching on the projector motor. The reel should indeed turn (start turning of its own accord), but it should also be easily restrained.

7. Complete Lubrication. Oil and grease the motor, drive transmission, projector mechanism, and soundhead according to manufacturers' instructions, using the proper type of lubricant in every case. Drain the intermittent well and refill with fresh oil, if this has not already been done. Run-in the projector for 30 minutes and note the "feel" of the machine.

8. Automatic Fire Shutter. The projectionist should assure himself that the lifting and dropping action of the safety shutter is perfect. When checking this device by switching the motor on and off, *do not turn the motor on while the projector is coasting to a standstill.* In other words, wait until the machine is absolutely motionless before turning the motor on again. Failure to observe this precaution may result in injury to the gears.

(The timing of the occulting shutter, will be left until projection tests are conducted. It suffices for the present to see to it that undue backlash and endplay are eliminated from the shutter shaft, and that all the bearings have received proper lubrication.)

9. Motor Check. The starting action of the projector motor is an extremely important consideration. A faulty cutout or centrifugal switch must be corrected at this time. All electrical connections are examined — the starting rheostat requiring special attention — and of course, more than a passing glance must be given the motor switch. An unduly loose or otherwise defective switch should be *replaced,* and no attempt made to repair it.

10. Film-Flow Test. This step serves as a final check on the mechanical functioning of the projector.

Thread up the projector with a reel of film and run it off with magazine, mechanism, and soundhead doors open. Observe the flow of the film and the action of all working parts on the film side of the machine. If minor defects are discovered, they are now corrected. The film-flow test also provides an opportunity to ascertain the

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pickup time of the loaded projector.

11. Projection Lens. The projection lens is now carefully cleaned and restored to the projector. For the correct method of cleaning lenses refer to "Coated Lenses: Nature and Care" by A. E. Murray of the Bausch & Lomb Optical Company (IP for February, 1949, p. 7). So comprehensive is Dr. Murray's contribution to this phase of the projection art, that the subject is dismissed here with the oft-repeated admonition;

NEVER "scrub" lenses; NEVER wash lenses in alcohol or other organic solvents! Failure to heed this warning may ruin a fine lens.

Lamp & Ventilating System

12. Lamp and Ventilating System. The interior of the arc lamp may be so dirty that much time and effort will be required to clean it out. The presence of carbon stubs in the carbon holders is mute evidence of the laxity of the projectionist's predecessor.

If the vent pipes appear to be clogged with carbon dust and oxide fluff, take them down and clean them before cleaning the lamps. In any event, the effectiveness of the ventilating system should be tested long before an arc is struck. Invisible gases produced by electric arcs are highly poisonous.

As a rule, low-intensity get grimier than high-intensity lamps. Oil-caked carbon encrustations are frequently the cause of faulty mechanical action. The roof of the lamp should be cleaned first, and all ash removed from the vent. Then the floor may be brushed free of dust. Grease, graphite accumulations, *etc.*, may be washed with kerosene from the guide rods, feeding screws, and reflector gearing. After cleaning, lubricate all moving parts of the lamp according to the manufacturer's instructions.

Lamp Electrical Units

13. Lamp Electrical Appliances. Burnish the contact surfaces of the carbon holders. If light filing is necessary, use a magneto file, taking care to preserve the flatness of the surfaces. Then give them a final polishing with crocus cloth. Test the clamping action of the carbon jaws, and give rotating-positive feeds extra attention.

Electrical connections to the carbon holders, are relay, feed motor, *etc.*, must be secure. It is not uncommon for as much as 3 amperes to be lost through faulty carbon-holder lug connections. The lost current is converted into heat which aggravates the troubles by accelerating corrosion of the metal. The condition of the flexible asbestos-insulated cables must also be checked, for these cables, being composed of many fine strands of wire, are particularly liable to oxidation.

The cut-out points of arc relays may be touched up by drawing 00 sandpaper between them while lightly pressing them together. (For routine cleaning use heavy writing paper in

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place of the 00 sandpaper. *Never use emery paper!)*

Check the feed-motor rheostat and then proceed to the feed motor itself. Clean and check the condition of the commutator and the brushes. If the commutator is scored, touch it up with 00 sandpaper followed with writing paper. *Do not use emery paper or cloth on commutators!*

[TO BE CONCLUDED]

C'Scope Lens Price Slash Follows Prismatic Shows

Drastic price reductions in CinemaScope lenses were made during the past month by two major lens manufacturers. Bausch & Lomb and Bell & Howell. These price slashes, amounting to approximately $750 (from $1900) per pair were viewed in projection circles as a move to offer stiff competition to the Tushinsky and Gottschalk anamorphic prismatic attachments shown in New York recently.

Thus, CinemaScope lenses by B & L and by B & H, which, it should be remembered, are *cyclindrical* units, now sell in the $1150 per pair bracket; while the Tushinsky and the Gottschalk units, which are *prismatic* anamorphosers, are in the $700 to $1000 per pair range.

Picture Ratio Vital

Both B & L and B & H emphasize the fact that their CinemaScope lenses will project *all* CinemaScope releases, and that no prismatic anamorphic attachment can convert standard-format films to wide-screen proportions.

This statement was evidently made to correct an impression currently held by some exhibitors that the variable-type anamorphic attachments, such as the Tushinsky unit, can expand any standard print into something like CinemaScope. No anamorphic lens can function except with a print that has been "squeezed" for it.

New Processes Hypo GPC Equipment Sales, Net

General Precision Equipment Corp. net income for 1953 soared to $3,436,349 or $5.09 per share. This is more than double the net for 1952 which was $1,255,278 or $1.88 a share. Net working capital as of last Dec. 31 rose to $18,651,901, or better than $6,000,000 higher than a year earlier.

Sales of picture theatre equipment and supplies by subsidiaries last year were 66% better than in 1952, hitting a record of $22,878,000. Boost reflects the general improvement in the industry plus the heavy demand for new and improved equipment, including the multitrack single film system of magnetic sound reproduction.

Among the GPC subsidiaries are International Projector Corp., National Theatre Supply Co., J. E. McAuley Mfg. Co., Hertner Electric Co., and Strong Electric Co.

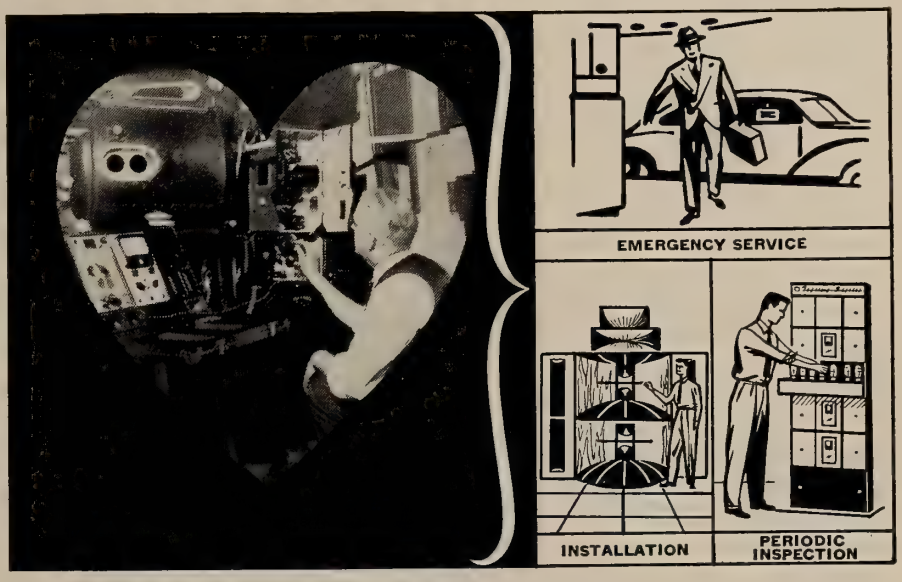
EPRAD Stereosound Car Speakers

The premiere showing of Eprad stereosound car speakers took place April 24 at the Cactus Drive-in, Tucson, Ariz., in connection with the CinemaScope showing of "The Robe" on a 90- by 40-foot screen. Strong Super "135" arclamps provided the projection light.

Two additional wires were buried to provide three sound wires and one common wire to the Eprad stereosound speaker units. The speaker case, which is 10 1/8 inches long and 3 13/16 inches high, is only slightly larger and heavier than conventional speakers, although it contains three 3 1/2-inch driver units. It is made of two-tone Fibreglas and mounts on the rear-view mirror.

Pathe Labs Lecture Series

Pathe Laboratories is expected shortly to launch a series of clinics on a trial basis to give producers, newsmen, critics, and projectionists the opportunity to become better acquainted with the latest developments in color film processing and better understand the role of the laboratory in motion picture production.



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LENSES: Projection Heart

(Continued from page 16)

the speed of the mirror may be reduced until it corresponds with the effective speed of the lens. This expedient reduces screen illumination, of course, but it improves the quality of illumination and decreases heating of the film.

A German Suggestion

Another method has been devised by Zeiss Ikon of Germany, manufacturer of the Ernemann projectors. Instead of increasing the speed of the projection lens or decreasing the speed of the arc-mirror, the light-rays which emerge from the aperture are all directed into the projection lens by means of a special single-element lens placed directly behind the aperture. This special lens is called a *Bildfensterlinse,* a German word meaning "picture-aperture lens."

Figure 4 illustrates diagrammatically how this lens forms a small, intensely brilliant image of the arc-reflector *inside the projection lens.* The special lens is placed as close to the aperture as possible in order to form the smallest possible image of the mirror, insuring that *all* of the light coming from the aperture goes into the lens for projection to the screen.

Picture—Aperture Lens

The "picture-aperture lens" impresses us as a worthwhile contribution to projection technology. Made of special heat-resistant optical glass, it is inserted into the Ernemann projector as shown in Fig. 5.

Actual tests show that this lens considerably increases the brightness of the picture when employed in conjunction with the *Wabenkondensor* lamp (See IP for January 1954). It is evident from Fig. 4 that the *Bildfensterlinse* produces the effect of matching the projection lens with the lamp-optics without requiring the use of lenses of extreme speed and unsatisfactory optical characteristics.

Cleaning of Lenses

A fine lens should be accorded even better care than a priceless jewel. A diamond, being harder than optical glass, better withstands careless scrubbing and scratching! Coated lenses require special thought, if not special care, because the anti-reflection coating

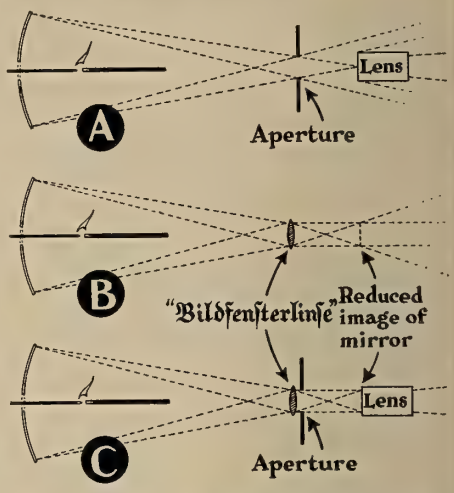


FIG. 4. How the Zeiss-Ikon Bildfensterlinse (picture-aperture lens) defies the laws of optics. In (A) is shown a conventional mirror-aperture-lens projection system. Note that much light is wasted because the lens isn't big enough to intercept all of it. In (B) we see what happens when a small, powerful lens is placed in the lamp beam at aperture distance — an intensely brilliant reduced image of the mirror is formed in mid-air a few inches away from it. In (C) such a "picture-aperture lens" is placed behind the aperture to route all of the light rays into the projection lens. The effect of perfect optical matching is thus cleverly produced without using impractically large projection lenses.

is a film of magnesium fluoride only 1/8000 mm thick — about 800 times thinner than this sheet of paper.

So, even though the coating on a coated lens is somewhat harder than most glasses, it is so thin that it can easily be scratched off. And scratches, as well as fingermarks, oil-spots, and

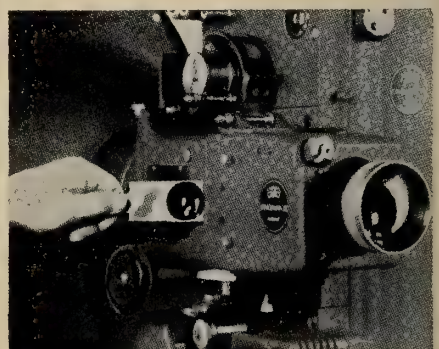


FIG. 5. Projectionist inserting the "Bildfensterlinse" behind the aperture of an Ernemann projector — the picture-aperture lens.

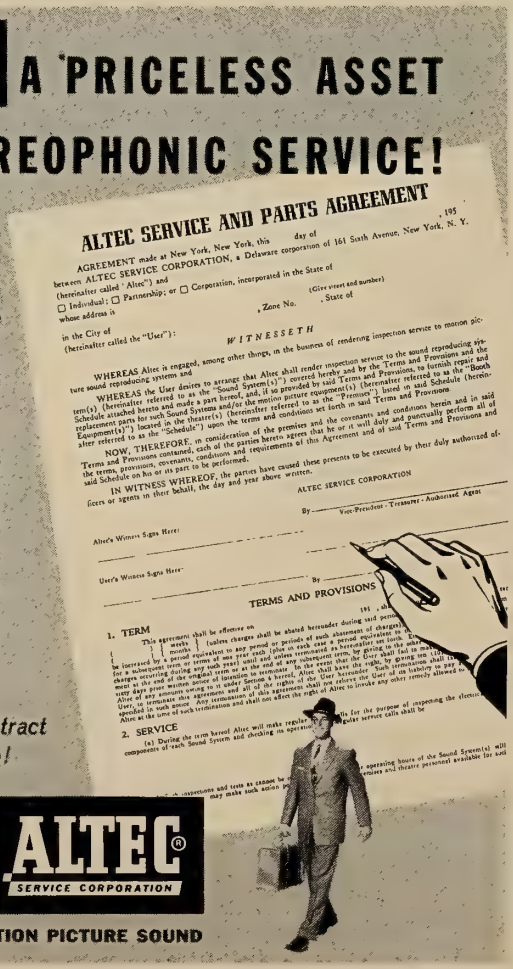
other stains, are extremely conspicuous on a coated lens because they destroy the anti-reflection properties of the coating.

As for removing dirt from lenses, both coated and uncoated lenses

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ALTEC SERVICE AND PARTS AGREEMENT

AGREEMENT made at New York, New York, this day of 195

between ALTEC SERVICE CORPORATION, a Delaware corporation of 161 Sixth Avenue, New York, N. Y. (hereinafter called "Altec") and

☐ Individual; ☐ Partnership; or ☐ Corporation, incorporated in the State of

whose address is (Give street and number) in the City of , Zone No. , State of (hereinafter called the "User"):

WITNESSETH

WHEREAS Altec is engaged, among other things, in the business of rendering inspection service to motion picture sound reproducing systems and

WHEREAS the User desires to arrange that Altec shall render inspection service to the sound reproducing system(s) (hereinafter referred to as the "Sound System(s)") covered hereby and by the Terms and Provisions and the Schedule attached hereto and made a part hereof, and, if so provided by said Terms and Provisions, to furnish repair and replacement parts for such Sound Systems and/or the motion picture equipment(s) (hereinafter referred to as the "Booth Equipment(s)") located in the theater(s) (hereinafter referred to as the "Premises") listed in said Schedule (hereinafter referred to as the "Schedule") upon the terms and conditions set forth in said Terms and Provisions

NOW, THEREFORE, in consideration of the premises and the covenants and conditions herein and in said Terms and Provisions contained, each of the parties hereto agrees that he or it will duly and punctually perform all of the terms, provisions, covenants, conditions and requirements of this Agreement and of said Terms and Provisions and said Schedule on his or its part to be performed.

IN WITNESS WHEREOF, the parties have caused these presents to be executed by their duly authorized officers or agents in their behalf, the day and year above written.

ALTEC SERVICE CORPORATION

By Vice-President - Treasurer - Authorized Agent

Altec's Witness Signs Here:

User's Witness Signs Here:

By

TERMS AND PROVISIONS

1. TERM

This agreement shall be effective on

{ } months { } unless changes shall be effected hereunder during said period, be increased by a period equivalent to any period or periods of such abatement of charges, for a subsequent term or terms of one year each, unless terminated as hereinafter set forth. Each such extension charges occurring during any such year) and, unless terminated as hereinafter set forth, shall fail to be effective sixty days prior to the end of the original term or as the case may be, the end of any subsequent term, by giving notice at the end of the original term or of any subsequent term, by giving notice to the other party hereto of its intention to terminate this agreement at the end of the original term or of any subsequent term; provided, however, that the User shall have the right, in the event the User shall fail to receive such notice from Altec of termination of this agreement, to terminate this agreement at any time thereafter upon sixty days' written notice to Altec. Such termination shall be effective on the sixtieth day after the receipt of such notice by Altec. Such termination shall not relieve the User of any liability to pay amounts owing to Altec under Section 6 hereof, nor relieve the User or Altec of any of the rights or obligations of the parties hereto which shall have accrued prior to the effective date of such termination. Upon any such termination of this agreement, Altec shall be entitled to payment for all of the services rendered and all of the expenses incurred by Altec to the date of such termination, at the rates specified in the Terms and Provisions, and shall not refund any portion of any charges theretofore paid to Altec at the time of such termination and shall not affect the rights of Altec to invoke any other remedy allowed to it by law.

2. SERVICE

(a) During the term hereof Altec will make regular periodic inspections and tests as deemed necessary for the purpose of inspecting the electrical components of each Sound System and checking its operation. Such regular service calls shall be

operating hours of the Sound System(s) will ...ations and theatre personnel available for said

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SPECIALISTS IN MOTION PICTURE SOUND

should be cleaned the same way — with utmost care.

1. Dust. Remove with a soft, dust-free camel's-hair brush of the type used by water-color artists.

2. Surface Slightly Soiled. Breathe on the surface and gently wipe with a very soft, dry linen rag (frequently washed). Breathe on the lens again before each wiping.

3. Surface Heavily Soiled. Dissolve a piece of Ivory Soap the size of a small pea in a pint of pure (preferably distilled) water to make a weak soap solution. Dampen a clean linen rag with this mild solution, wipe the surface, then polish with a dry linen rag as under (2) above, *breathing on the glass.*

4. Oil on the Surface. Moisten a soft linen rag with clean gasoline (lighter fluid) and wipe off oil. Continue as under (3) and (2) above.

5. Special Stains. *Paint.* Remove cautiously with turpentine, and continue as under (3) and (2) above. *Film Cement.* Remove very cautiously with a half-and-half mixture of acetone and chloroform, and continue as under (3) and (2) above. Apply these powerful solvents very sparingly, and only to the soiled spot, *not* to the entire lens-surface.

Warning! Use only linen or cotton rags for cleaning lenses, never wool, silk, or rayon, which scratch. Wool also leaves greasy streaks on glass. Do not use "lens-paper" on coated lenses, and especially avoid silicone-impregnated spectacle-cleaning papers.

Use only a soap solution containing nothing but a pure soap, such as Ivory cut from a fresh bar. Never use soap powders or soapless detergents, many of which are adulterated with caustic chemicals capable of attacking glass or dissolving the magnesium fluoride coating.

Warning About Solvents

Never wash lenses with alcohol, acetone, ether, carbon tetrachloride, or similar organic solvents which may seep into a lens and blister the cements with which achromatic couplets are cemented together. Avoid all commercial lens-cleaning nostrums. No attempt should ever be made to take modern sealed lenses apart.

The oftener we clean the mechanisms of our projectors the better they will work; but lenses should not be cleaned more often than is absolutely necessary. A lens can "wear out" only through over-cleaning. Examine the lens daily and clean only the surface which needs cleaning.

In nearly all cases the rear lens facing the aperture gets the dirtiest; the front lens usually having nothing more than a few dust-specks which can be whisked off with a brush. The rear surface is exposed to hot, oily film, and thus gradually becomes fogged by an almost invisible coating of oil-droplets. This oil-film makes the picture dull and hazy; but it is readily removed with the weak soap solution.

Barring accidents, a lens will last almost indefinitely with sensible treatment. One important thing to guard against is the projection of blank light to the screen without having the projector running.

Even though the rotating shutter cuts the light in half, it is unwise to leave the light on the lens too long. The intense heat may blister the Canada balsam or synthetic resin used for cementing the lens-elements together. When high arc-amperages are used, the sudden heat of the full beam on a cold lens may actually crack the rear element. This is especially likely to happen if the lens is covered with a dew of moisture condensed from the air.

[CONCLUSION]

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AS OF THE MOMENT

(Continued from page 10)

try. This view was buttressed by the fact that immediately following the Tushinsky demonstrations in New York the price of the CinemaScope cylindrical lens was drastically reduced from $1800 a pair to $1095 for a small pair and $1195 for a large pair. To the best of our information, the price of the Tushinsky anamorphic attachment will be $700 a pair.

The Gottschalk anamorphic lens attachment unit, which was demonstrated in New York a few days following the Tushinsky exhibition, is a similar prismatic device, and it is quite probable that the considerations enumerated previously anent the Tushinsky unit apply with equal force to the Gottschalk unit.

Single-Track Optical Sound

An escape from the manifold problems posed by the various new processes is offered by the single-track, straightaway optical reproduction system now enjoying the favor of both Paramount and M-G-M, known as VistaVision. We append hereto an official statement by Paramount Pictures Corp. anent this process.

"The position of Paramount is, and has been from the beginning, that any plan developed should be applicable to *all theatres, large or small.* Furthermore, such a plan should not make it *mandatory* for the exhibitor to invest large sums of money in new equipment. . . .

"Paramount is firmly convinced it has the overall answer to the problem of how to improve the presentation of motion pictures and that all exhibitors will be able to afford it. . . .

"VistaVision will be available to *any* and *all* motion picture production companies and can be used by *any* theatre of any size in the world.

"From the beginning, Paramount determined that in the presentation of a motion picture on the screen *HEIGHT* was equally as important as width." (This coincides exactly with the stand taken by IP since the introduction of all these various new processes.—ED.)

"Therefore, Paramount recommends that every exhibitor install the largest possible screen both as to *height and width* that his theatre will permit. Having done this, the exhibitor will be able to play pictures of any size and ratio he desires.

"VistaVision uses a new camera technique which produces a picture of the highest quality ever seen on the screen.

"The VistaVision camera uses a horizontal double-frame negative to photograph the picture. This double negative photographs images on an area 2½ times the regular 35-mm camera frame. This large negative is then compressed, by printing, to a standard 35-mm frame for release prints.

'Fuzzyness' Drastically Reduced

"This process eliminates grain and fuzziness and provides an overwhelming picture with complete definition of focus and the finest quality picture it is possible to obtain. In addition, the VistaVision camera permits the use of lenses in photographing with an angle varying from 9 up to 75 degrees, and still permits the photographing of scenes without distortion due to the excess ratio of width to height.

"With the VistaVision Process, people and the objects around them can be photographed *as seen by the human eye.* It is not necessary to regroup or diminish the size of actors to meet abnormal limitations of height with respect to width.

"The key words in Paramount's plan are "compatibility" and "flexibility." Under this plan it is optional with the exhibitor as to whether he installs auxiliary sound equipment or not. If auxiliary sound equipment is to be used, it is Paramount's finding that dimensional sound is simpler and less costly in every respect than stereophonic sound and the results are approximately the same.

Sound Reproduction, Cost

"Dimensional sound is from a single sound track on the positive print. This track will be available on Paramount pictures. If an exhibitor desires to use dimensional sound he will, of course, have to install a sound control unit in his projection room—the cost, approximately $1,500.

"Through this system the sound will be directed to three horn units — one at the left of the screen, one in the center and one at the right of the screen. If the exhibitor does not have the horn units available, he will need to purchase these in addition to the sound control unit. This equipment will cost the exhibitor approximately an additional $2,000.

"Prints of Paramount pictures, starting with "White Christmas," will have the directional sound control on the sound track. However, this same print containing the directional sound control can play in any theatre in the normal way."

Honest Endeavor Applauded

IP will never decry any honest endeavor in the technological area which will contribute in even the slightest degree to the welfare of the industry. At the same time we hold seriously to the view that it is our responsibility to report and evaluate in terms of practical application any device which purports to enhance the entertainment value of the projected motion picture image.

When the once-vaunted fifth largest industry in the world requires for the showing of its product to the paying public six projection lenses for the various processes — all for the lack of an agreement on standards — then we have indeed reached a deplorable — nay, desperate — stage.

Out of sheer weariness by reason of constant repetition, IP once more suggests that a meeting of only ten technical personnel (free from the influence of executive "brass") — five from the Coast and five from the East — could within the space of a few hours agree upon and settle finally such matters as a standard aspect ratio, stereophonic sound, *etc.*, which our industry so desperately needs.

SMPTE Convention Starts May 3

A number of papers investigating the early history of the motion picture industry will be read at the 75th semi-annual Convention of the SMPTE, which opens May 3rd and runs for five days at the Hotel Statler in Washington, D. C.

The historical tone will be set by the authors of 15 papers, who for more than a year have combed archives, examined antiquated cameras, projectors and old films for clues that would shed new light on the early history of the motion picture industry. In addition to describing the evolution of modern projectors and cameras, the speakers will examine early successes and failures in the making and processing of film and in the recording and reproduction of sound.

There will also be the usual wide selection of papers on new engineering achievements in the motion picture field. To be reported on are Vista Vision, Perspect-A-Sound, an Xenon-arc projection lamp and a variety of other developments.

Balaban & Katz Goes "Flat"

Balaban & Katz's Chicago Theatre has been equipped with a flat Radiant Astrolite screen 60 feet wide and 29 feet high. This is the second large theatre to announce that it will use a flat screen for CinemaScope. The first was the Radio City Music Hall installation which IP reported on in detail last month.

Balaban & Katz is also installing Raytone screens in the Senate, Central Park, Nortown, Biltmore and United Artists theatres, bringing to 19 the number of B & K theatres equipped for CinemaScope. Eighteen Great States houses are also CinemaScope equipped.

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To build security for those we love—that is our common dream. And it is a dream that can come true only in a country like America. For only in a free land is every man and woman free to work for it.

It is by taking care of our own that we also make America strong. For the strength of our country is simply the strength of each secure home joined to the security of another.



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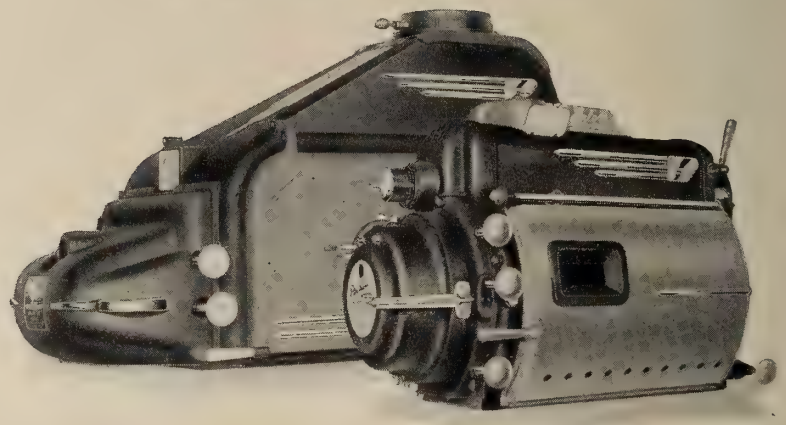
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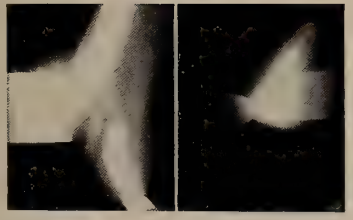
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MONTHLY CHAT

MENTIONED previously in these pages—and often with more than a bit of rancor—is the sudden conversion of executive personnel in the motion picture industry to the doctrine of technical competence. We, who have often wondered whether these people knew of the existence of a projection room, a camera, a photo-electric cell, a generator, or a sprocket, are now being beguiled by the spectacle of Mr. Mighty Industry facing an audience and begging for attention to those details which have always determined the success or failure of the industry's effort—the image on the motion picture theatre screen.

Recently, the patriarch of the industry, Mr. Adolph Zukor, faced an audience of some 4000 in Radio City Music Hall in New York. Did this venerable gentleman talk about the sale, the price, or the dating of motion pictures? Not at all. He delivered himself of a sane, simple plea that the various processes now being utilized by the industry be given the impetus of good equipment handled competently.

Mr. Zukor himself would have no objection, we feel certain, to the appended reconstruction of his remarks:

"Today everything that we in this business hope to achieve depends upon our technological resources. We at Paramount feel that all our efforts are dependent upon the finest equipment expertly used. All that we pour into a narrow ribbon of film goes for naught if we do not reproduce it properly on the theatre screen. For my part, I am glad to stand here and beg—beg, mind you—that every theatre in the world avail itself of the finest equipment that money can buy. Such equipment, in the hands of competent craftsmen, will go far toward solving our most pressing problems."

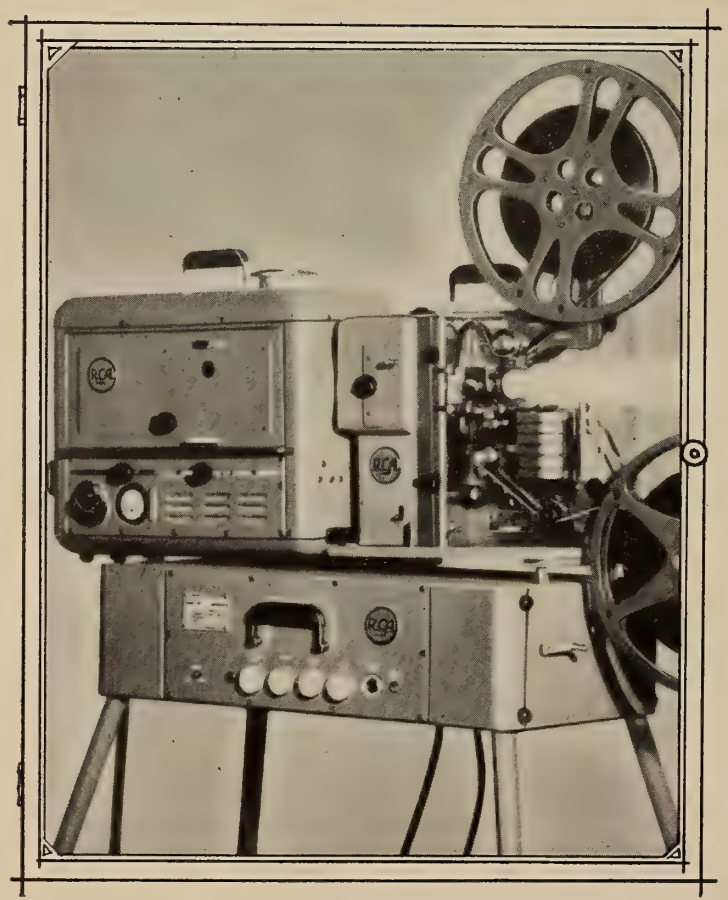
Thus spoke Mr. Zukor. But even as he spoke there were among his audience a group of people who, seizing upon such trifles as acetate film, electric motors, push-button curtain drapes and the like, were actively engaged in a concerted action to break down that standard which contributes the vital element to the successful presentation of a motion picture—the sure, deft touch of the experienced craftsman.

Sure, give us magnetic soundtracks; sure, give us multiple loudspeakers; sure, give us 3-D; sure, give us ample arclight ranging up to 200 amperes—but, God *NO*, don't give us the experience, the patience and the trust in a competent day's work which must inevitably accompany such appurtenances.

Grant us, God, an overflowing box-office, Miami in mid-winter, the country club in the summertime and all the other manifestations of Heavenly munificence. But also, God, deliver us from the scourge of paying in the form of wages for these blessings.

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VOLUME XXIX MAY 1954 NUMBER 5

The Anatomy of CinemaScope

By ROBERT A. MITCHELL

Twentieth Century-Fox seems to think that the paying patron at movie box-offices is interested not in entertainment value but in optical weight-lifting feats which encompass gigantic screens. Quality of visual image and acceptable accompanying sound have been sacrificed to the Great Jehovah — SIZE.

SEEMINGLY, the theory of relativity has been visually confirmed by CinemaScope. Space is curved—see it for yourself. A flat floor in a CinemaScope picture looks like the interior of a bathtub. Walls vault in graceful arches. Rivers flow uphill, and skyscrapers emulate the leaning tower of Pisa.

As we gazed at these Einsteinian marvels in "The Robe" and in such less pretentious C'Scopers as "How to Marry a Millionaire," we wondered if the curved screen might not become the nemesis of the 20th Century-Fox anamorphic process. Will the theatre-going public, long accustomed to perfect pictorial delineation in the movies, tolerate CinemaScope's manifold distortions after its novelty-value has subsided? The writer thinks not. Even 3-D, far more realistic visually than CinemaScope, has failed to oust the time-tried conventional type of screen presentation. And CinemaScope has no depth—only weird distortions.

CinemaScope and Curved Screens

Because the anamorphic optics of CinemaScope function with fair success, and with promise of becoming better, flat-screen projection of CinemaScope would undoubtedly have been far less irritating than the curved, roller-towel version employed to date.

Curved screens wreck proportion and perspective. Only the special 3-projector system used by Cinerama can get away with curved-screen monkeyshines. In Cinerama the curved screen is intended to "surround" the audience with the picture. This Cinerama does, and very effectively. Not so with C'Scope's much shallower curved screen.

While it is theoretically possible to get a Cinerama-like picture with only one projector of special optical design, it is obvious to the technically informed that C'Scope fails to give the desired "surrounded" feeling. That may be a good thing in view of the fact that most moviegoers, after having seen a novelty process two or three times, attend movies for relaxation, *not distraction.*

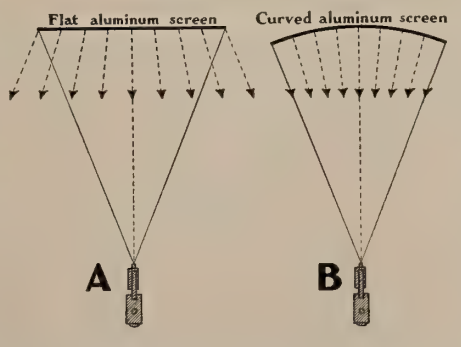


FIG. 1. Reflection of light from (A) flat and (B) curved aluminum CinemaScope screens. A flat white screen would give even distribution of light, but would require twice as much projection light. An additional metallized screen would be needed for 3-D.

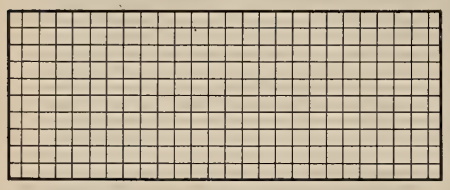
Cinerama is good in its own field, but it is hardly a dramatic medium. CinemaScope, on the other hand, being midway between Cinerama and conventional movies, is in the writer's book, neither fish nor fowl.

Limit of Screen Curvature

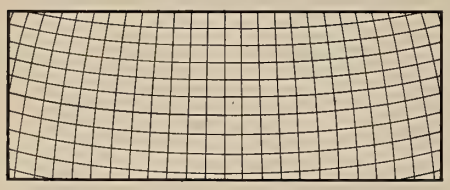
There is a definite limit to the amount of curvature permissible with the CinemaScope screen. In practice, the radius of screen-curvature is the distance from the projector-aperture to the middle of the screen. In other words, screen-curvature radius is the same as the "throw." In theatres having short projection distances, the CinemaScope screen will have greater curvature than in theatres having longer throws.

The curvature of the CinemaScope screen apparently has only one useful function, namely, better distribution of picture-illumination from its aluminized surface. An aluminum screen has "specular" properties similar to those of an ordinary mirror. If such a

screen were perfectly flat, light projected upon the side areas would bounce off to the walls of the auditorium and be wasted audience-wise. By curving the screen so that the



CinemaScope-delineation at a projection-angle of 0 degrees



Curved-screen distortion of CinemaScope projected at an angle of 20 degrees

FIG. 2. Distortion of CinemaScope pictures caused by the combination of screen-curvature and downward tilt of the projectors. The amount of distortion shown here has not been exaggerated.

radius of the curve is equal to the projection throw, the side areas reflect the light they receive to the seating-area (Fig. 1).

Curved Screen Distortion

If a CinemaScope picture be projected "on the level" (that is, with a zero-degree projection angle) no distortion due to the curvature of the screen will be apparent to patrons seated near the center-line of the auditorium. Patrons in side seats, however, will notice a perspective-foreshortening which is greater at the nearer side of the curved screen. The effect is such that an actor "gains weight" as he walks from the nearer to the farther side of the screen.

Matters are complicated (for the worse, unfortunately,) when the projectors tilt at an angle. In normal projection a steep projection angle produces two interrelated effects: a "keystone" shape of the picture-frame and an elongation of the images which makes actors appear abnormally tall and thin.

The keystone-effect is mitigated by obtaining apertures of undersize width and filing them to a trapezoidal shape. Elongation cannot be remedied, although in narrow theaters the screen may be tilted back slightly to minimize it. Moderate projection angles do not appreciably affect the quality of standard flat-screen pictures.

With CinemaScope we encounter difficulties of a more serious nature even when the projection angle is comparatively small—difficulties due partly to the enormous width, but mostly to the curvature, of the screen. What really happens to CinemaScope images projected at an angle is geometrically a rather complicated problem, but the effects are apparent even to the most casual observer. The picture undergoes a gross distortion, the topic of frequent unfavorable comment by patrons. CinemaScope often tempts us to laugh even when the picture is unfunny.

Bizarre Image Elongation

A downward tilt of the projectors in CinemaScope converts horizontal lines into curves that bend upward at the ends. The ocean looks like a maelstrom, and speeding trains maneuver strange humps and hollows. At the same time, all vertical lines become arched at the sides of the screen (Fig. 2). Skyscrapers bend and lean perilously.

So grotesque is the effect that any "grandeur" which the CinemaScope picture might otherwise have is nullified. Only natural landscapes composed of irregular lines and masses successfully mask the distortion and give pleasingly realistic reproduction.

These disturbing distortions make their appearance when a motion picture of *any* aspect-ratio is projected on a curved screen, thus are not peculiar to CinemaScope. The anamorphic-lens process has nothing to do with these effects, of course; but a wide-screen picture will suffer more than a picture of normal proportions on a curved screen simply because wider angles are involved.

Projection Room vs. Audience Viewing Angle

Projectionists should remember always that curved-screen distortions, even when acute, cannot be seen from the projection room. Neither, for that matter, can the lengthening, or elongation, of normal pictures projected at steep angles. The line of sight of an observer in the projection room so nearly coincides with the optical axis of the projection setup that distortions due to projection angle and screen curvature are practically eliminated for him—*but for him alone.* Patrons in the auditorium look at the screen from very different angles, and accordingly see these distortions.

Because the projection crew ought to know what kind of picture the audience sees, every projectionist, whether he shows CinemaScope or not, should study the screen images from different points in the auditorium, especially from the "orchestra."

Why curve the CinemaScope screen at all? We have seen that fadeaway of light at the sides of the picture precludes the use of flat *aluminum* screens. If CinemaScope is to be projected on a flat wide screen (which would eliminate the intolerable geometric distortions peculiar to curved screens) we must use a matte white screen. Matte screens undeniably give clearer, more evenly lighted pictures than do aluminum screens, but since they are "diffusive," rather than "specular," they require almost *twice* as much projection light for the same apparent picture-brightness.

The exhibitor saves money on carbons and electricity when he uses an aluminum CinemaScope screen, and he is also spared the expense of installing a special metallized screen

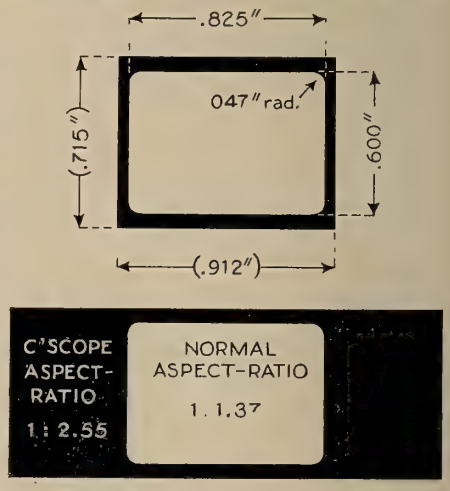


FIG. 3. Relative sizes of standard (white) and CinemaScope (black) apertures and screen images. The CinemaScope screen image is expanded to twice normal proportions by the anamorphic lens-attachment. Lenses of slightly shorter focal length should be used to produce a standard picture with the same height as the CinemaScope picture.

for polarized-light 3-D showings. Also, 20th Century-Fox approved only two makes of screen for its CinemaScope films, Miracle Mirror and Astrolite, both of which are metallic.

CinemaScope would undoubtedly appear to much better advantage on a flat white screen; and while the exhibitor has heretofore not been al-

(Continued on page 32)



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"THERE'S A BRANCH NEAR YOU"

Who Killed Cock Robin ?

By CHAUNCEY L. GREENE

Member IA Local 219, Minneapolis, Minn.

WITH 3-D dead — if not decently interred — a post-mortem is presumed to be in order. Much has been written — and most of it would seem to be true — about the low order of story material assigned to 3-D production, but in IP we should properly concern ourselves with the projection aspects of the 3-D post-mortem.

The true situation was unconsciously evaluated more correctly by a service company engineer many years ago. Speaking of the nuisance of "shimming" projector mechanisms when mounting them on ERPI soundheads he said, "The whole trouble was that we were trying to fit our precision mechanism to one which was not a precision mechanism."

Calling a projector head a non-precision mechanism is a slight error, to say the least, but if the engineer had taken in considerably more territory he would have been far more correct and pin-pointed the underlying situation. *They* were trying to fit a precision industry (telephone) to one (theatres) which never had been, was ignorant and therefore fearful of, precision and fanatically determined never to be a precision industry.

Exhibitor Stubborness

Through the years the exhibitor stubbornly clung to this policy. The cornicopia of science and invention poured lavishly into his lap. High intensity and high fidelity came forth from the golden horn by the early thirties, followed by push-pull reproduction, extensive use of color, Ben Schlanger's screen, stereophonic sound (Fantasia) and 3-D. All these were offered him long before the war but he wanted none of them. In the few instances when he did grudgingly accept one, he did his best to emasculate it.

A good example was exhibitor rejection of Fantasia's special sound equipment and the hanging of a few echo squawk-boxes around the walls, which jerry-rigged assembly was sold to the public as *Fantasound*. The public came, heard, and was not impressed. Most of them never guessed that they never heard the *real thing*. If that was the brave new world of the cinema they didn't think much of it's future.

Economic Suicide

The exhibitor had taken the first step to prepare his audience for television, but he never knew it. He smiled smugly. He was, he told himself, one smart cookie; *this* was showmanship. Also, he was resisting subversive influences threatening to undermine the fine old traditions of show business. Actually he was building up the technological vacuum into which television was drawn. Television did NOT invade the theatre industry; it was sucked into the technological vacuum the exhibitor created and fostered.

The man (was it Sam Goldwyn?) who said that a man could make more money with less brains in motion pictures than anywhere else spoke truly. Can anyone imagine an auto dealer prospering while offering 1932 cars in 1950? How long would any Cadillac dealer remain in business if he replaced the Cadillac motor with a "Jeep" engine and filled the gearboxes with sand before delivering the cars to the buyers?

Then, when the effects of television began to be felt, did the exhibitor seek to exploit any of the manifold things which the screen could do which television could not possibly imitate? Scarcely. Instead he "cut out all frills", reduced lighting, curtailed cleaning and in countless ways advertised to his public that his was a retrogrescent and dying industry.

The Discerning Eye and Ear

The public was quick to quit the sinking ship. If television had been fostered by that calibre of mentality, its tremendous technological problems would never have been solved. Tv would never have been a threat to anything but insomnia.

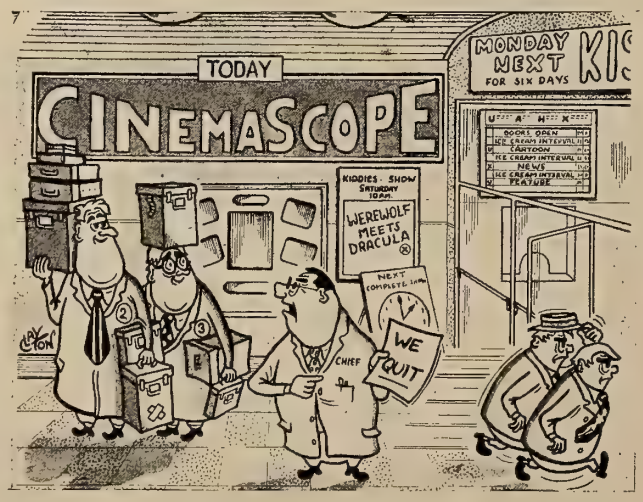
Suddenly a little clique tossed the exhibitor unceremoniously into the stream of normal competitive business activity and he went bouncing down the river bawling for help. Three great ogres rose to confront him.

1. He was going to have to spend money.
2. He was going to have to yield to the demands of precision instead of playing both ends against the middle and (worst of all),
3. He was face-to-face with increased wages and manpower.

This last was sheer communism and he would have none of it. Rags were royal raiment if worn for virtue's sake.

Now to the rescue of the exhibitor's virtue came a prominent motion picture personality, who couldn't have made a creditable presentation of a "flat" and silent motion picture, to proclaim: "It's only runnin' pitchers". The exhib rallied to this Messiah. Come whatever else, he would resist

(Continued on page 32)



Ideal Kinema, London

"Of course I'm annoyed. Just when I get a couple of promising trainees you have to crack that old one about cleaning out the perforations in the screen with a pin."

VistaVision: Promise of Sanity

PARAMOUNT Pictures pranced into New York City during April's closing days and before 4000-odd critical industry personnel in the giant Radio City Music Hall proceeded to demonstrate *via* its VistaVision process that a large measure of executive and technical sanity survives within the higher eschelons of major-company producing and distributing personnel.

For VistaVision, in addition to its captivating visual impact—sensible proportions, depth of focus, edge-to-edge flatness of field, and ultra-fine color—also gave rich promise of being the keystone for industry-wide technical standardization.

Simplicity, Compatability

Details of the VistaVision system, in conception and execution, in both production and exhibition, have been published in these pages, but the Music Hall show, the first public demonstration of the system, lent confirmation of the worth of the process.

Simplicity and compatability are the keywords for VistaVision, with a new development in photography providing a maximum of entertainment value at a minimum of expense. The fact that theatres the world over may utilize its advantages on *standard* projection equipment makes it doubly attractive.

The New York demonstration gave rise to several important technical questions, concerned mostly with projection procedure, which bear directly on the existing widespread confusion as to the proper utilization of the process.

Important Technical Questions

The VistaVision demonstration definitely established once and for all the, to us, inherent error of a motion picture screen image that gave merely width but not height. Before we consider the questions and answers stemming from this VistaVision showing, we should like to set forth here a brief resume of the process, as detailed by Loren Ryder, engineering director of Paramount Studios, Hollywood:

Paramount's consistent belief that wide-screen presentation is enhanced by adding height, and the need for greater screen clarity, prompted the development of this system. The first step was a method of procuring better original photographic detail. This was accomplished by exposing the area of two frames horizontally on regular 35-mm film, the camera being turned on its side.

Larger Camera Negative

Using a wider-angle lens and pulling 8 sprocket holes before the lens instead of the conventional 4, a new, large negative measuring 1.472 by 0.997 inches was produced (Fig. 1). With almost three times the area of a standard 35-mm frame exposed, much more detail was photographed than was possible on a standard frame. Furthermore, scenes can be photographed for best composition in aspect ratios of 1.66-to-1 or 1.85-to-1.

The next step was to get an optical reduction on regular 35-mm film so that it could be shown in any existing theatre without changes in projection equipment. For this a new technique was developed whereby in the printing process the large negative was turned 90 degrees and printed the same as any previous release film (Fig. 2).

The net result of such a process meant that the original depth of focus was retained in the reduction and the grain effect was practically eliminated. When projected, the full beauty of the entire scene is reproduced.

Aspect Ration All-Important

IP restates its firm conviction that motion pictures shot on a flat plane should be shown in the same manner. IP recognizes that the flat matte screen used for the VistaVision demonstration (68 feet wide by 37 feet high) poses a terrific problem of acceptable illumination. This Music Hall showing pulled 220 amperes—with benefit of filters, blowers, and sundry assorted cooling aids. Where in the name of reason may such conditions be duplicated? The answer is simple: nowhere.

The confusion created by the VistaVision showings stems from one point—the mistaken notion that such release prints may be shown in all aspect ratios from 1.33-to-1, to 2.55-to-1. But even Paramount, flushed with its VistaVision success, not only admits but *insists* that the most desirable ratio is 1.85-to-1.

Now, what does this mean to we projection people? It means that once the screen proportions permissible by the physical characteristics of a given theatre are established, we people go out and get ourselves a wide-angle, short-focal, lens to properly fill the desired screen area. It's as simple as that.



FIGURE 2.

Full-size reproduction of the 35-mm release print made from the double-frame VistaVision negative. Latter is turned 90 degrees and printed down to area shown. Resultant print gives greater resolution.

Part of the confusion over VistaVision probably results from the announcement that the Tushinsky lens, a variable anamorphic lens attachment, could be used with a special anamorphic VistaVision print that would be supplied to exhibitors upon request.

"Ratio In Which It Is Short"

This announcement gave rise to the idea, particularly among exhibitors, that a marvelous lens had been discovered that was capable of projecting

FIGURE 1.

Full-size reproduction of the VistaVision camera negative showing size and placement of the image. Note clarity of detail.



a "rubber" picture. Some thought that the aspect ratio of any release print could be varied all the way from the standard 1.33-to-1 up to 2.55-to-1 merely by a simple twist of a knob on the Tushinsky lens.

This, of course, is not the case. Specially-made anamorphic prints for different aspect ratios ranging from 1.85-to-1 through 2.55-to-1 would be required. The Vista-Vision anamorphic print is designed for projection at an aspect ratio of 2-to-1. This ratio cannot be varied more than a small amount without causing unpleasant distortion on the screen.

Two Different Prints

Aspect ratios below 2-to-1 are to be obtained by using the other unsqueezed VistaVision print (there will be two prints available) and then using different aperture plates and different focal-length lenses for each aspect ratio.

Another innovation with VistaVision is the framing marks shown in the upper right-hand corner of the picture frame in Fig. 3. These markings are to be made less apparent than changeover markings and are to be used by the projectionist in gaining proper framing.

Screen Image Framing

The framing marks appear only at the head end of the 2000-foot reels. The first such marks will appear approximately 5 feet in from the start of the reel, and the second set of marks will appear 8 feet in from the start of the reel.

In framing for a 1.33 to 1 picture, the projectionist will frame just above

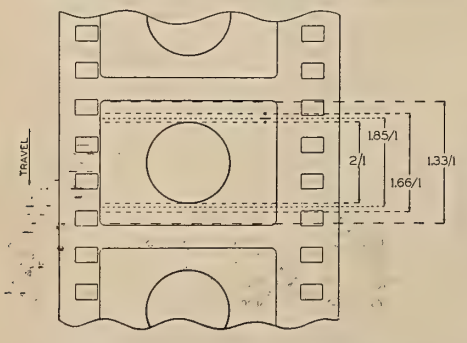


FIG. 3. VistaVision standard release print

the top frame line, in keeping with past practice.

If the picture is being projected in the aspect ratio of 1.66 to 1, the top frame line of the picture as seen on the screen should just cut the line. For a picture projected in the aspect ratio of 2 to 1, it should be just possible to see the bottom dot at the top of the screen.

In operation, the projectionist will complete his changeover operation and, while he is looking through the port, he will observe the position of the first set of dots. If the framing is incorrect, he will make a correction and gain a check observation by viewing the second framing signal.

Framing on VistaVision prints will be at the top of the frame in keeping with the prevailing practice.

A Bitter Lesson Learned . . .

Carthage had its counterpart in the spectacle staged during the first few days of May 1954 when the exponents of the 2.55-to-1 visual image, plus so-called "stereophonic" sound, admitted publicly that they might be wrong. Thus prevailed the lone voice among the trade press (IP), all but stilled by the raucous, if unreasoning, chorus of adulation emanating from the recipients of press handouts.

Banished is the utter nonsense of curved screens; relegated to the darkest caverns of idiotic thought is the so-called stereophonic sound; riddled is the senseless theory that one must show a picture of grotesque proportions which violates the rudiments of physiology and psychology.

IP, for its part, feels that as the sole reportorial agency in the motion picture business which has consistently fought this perversion of technological standards, it has served the common industry welfare. It has been a long, lonely road.

It is too much to hope that in future that which passes for a critical press in this industry will cease to exhibit a magnificent digestion for handouts from those to whom they are beholden. IP's path now, as in the past and in the future, is clearly defined—the demolition of vague figures having vague thoughts about vital matters.

Par's Electronic Splurge Cited in Corp. Report

Paramount's consolidated earnings last year (1953) increased to $6,779,563, equal to $3.06 per share, as compared with $5,899,871, or $2.52 per share in 1952. Profit in 1952 included a nonrecurring profit from the sale of real property of $559,287; while last year's results included $62,649 profit on sales of real property.

Paramount's operating revenues last year were $111,963,557, against $106,090,044 in 1952. Earnings from operations were up to $12,465,054, compared with $9,445,924. Dividends from nonconsolidated wholly owned companies were $261,102, against $146,215; while dividends from affiliated companies were $515,758, compared with $582,955.

Conceding the value of such "dramatic technical improvements" as CinemaScope, wide-screen, 3-D, and innovations in sound projection, Barney Balaban, Paramount prexy, observed that these not only aided the grosses of many pictures, but "more important—they excited public interest in 'movies' generally."

"Significant" Electronic Stake

Paramount, according to Balaban, views these developments as only the beginnings of a permanent enhancement of the film medium, and recalled the company's search for a process to provide a superior picture on any size screen in various aspect ratios. This, he informs stockholders, has resulted in the VistaVision system of photography and projection.

Paramount's "significant stake in electronics," Balaban pointed out, includes about 26% of Allen B. Du Mont Laboratories; 100% of station KTLA, Los Angeles; 50% of Chromatic Television Laboratories, and a majority interest in International Telemeter Corp. (pay-as-you-see Tv).

More VistaVision Cameras

The Technicolor Corp. is building six VistaVision cameras by modifying the same number of its regular 3-strip color cameras. Film runs horizontally through the VistaVision camera, permitting an oversize image to be registered sideways on the film. When this negative is used to make a smaller standard-size 35-mm print, there is a gain in sharpness which is particularly useful in wide-screen projection.

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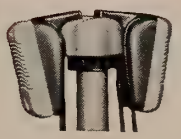
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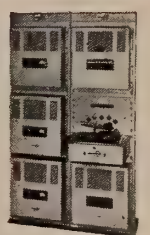
PROJECTORS



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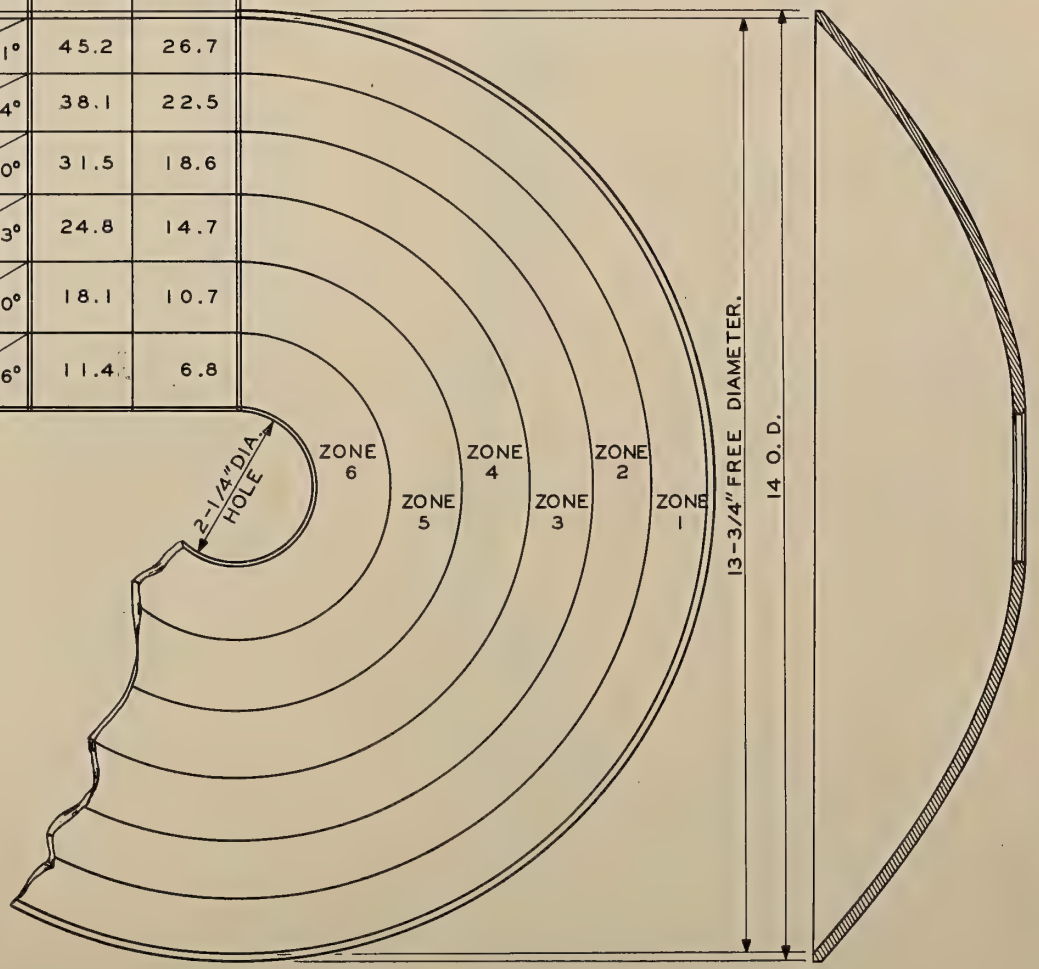


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SCREEN LUMENS PER ZONE	SCREEN LUMENS PER SQ. IN.	% OF TOTAL LUMENS	SCREEN LUMENS PER ZONE	SCREEN LUMENS PER SQ. IN.	% OF TOTAL LUMENS	ZONE INCLUDED PICK UP ANGLE	SQ. IN. AREA OF ZONE	% OF TOTAL SURFACE
2,270	50.3	10.2	1,734	38.4	10.2	146° / 131°	45.2	26.7
3,871	101.6	17.4	2,958	77.6	17.4	131° / 114°	38.1	22.5
6,697	212.6	30.1	5,117	162.4	30.1	114° / 90°	31.5	18.6
4,962	200.1	22.3	3,791	152.9	22.3	90° / 73°	24.8	14.7
2,670	147.5	12.3	2,040	112.7	12.3	73° / 50°	18.1	10.7
1,780	156.1	8.0	1,360	119.3	8.0	50° / 26°	11.4	6.8
TOTAL SCREEN LUMENS.	22,250		17,000					



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Backstage at Cinerama

Our good friend and colleague, Jack Gieck, with the cooperation of his publishers, *Movie Makers* (April 1954), has made available to us as an industry service his recent article on Cinerama.

UNTIL RECENTLY the Cinerama process has been cloaked in secrecy. Thus I was elated a few weeks ago when Ed Miller, Cinerama's resident engineer in Detroit, invited me to have a look into the inner sanctum. I could even bring my camera, he said.

On the appointed night I entered Detroit's Music Hall and found Ed at his desk in the cutting room, talking simultaneously to the telephone and to the intercom which connects him with the console operator and the four projection booths. Lining the walls of the room were rewind benches, splicing equipment and enormous square film cans storing Cinerama's 8000-foot reels.

"How's Charlie?" Ed was asking the intercom. Charlie, I figured, must be a member of the crew; but I soon learned that this was the phonetic designation for the left projection booth (the others being "Able" and "Baker," reading from right to left).

Seven Sound Tracks

To review briefly, Cinerama employs three projectors, each in its own projection booth, to cover a screen 66 feet wide by 24 feet high, curved horizontally on a 25 foot radius. The projectors, like the lenses on the camera which made the picture, are set 48 degrees apart to cover a field of 146 degrees on the screen.

Seven tracks of stereophonic sound (representing six microphone locations and one composite track) of extremely high fidelity are recorded magnetically on 35-mm film base. The magnetic sound reproducer is located in the fourth projection booth, situated above the balcony at the rear of the theatre. This booth also houses the standard 35-mm optical sound projector which projects the conventional movie prolog.

The Sound Room

The magnetic sound reproducer is about 7 feet tall with a 31-inch reel housing at top and bottom. The center section contains the soundhead and there are several sprockets to lead the film off the feedreel and onto the take-up reel. I found that all seven magnetic pickups are side by side in a single head narrower than the film width.

(This is in contrast to the Warnerphonic system—a la *House of Wax*, for example—which uses 35-mm magnetic film, but has only three tracks with the pickups staggered along the film.) What is even more surprising, under these conditions, is the absence of intermodulation (cross-talk) between the seven tracks.

Also mounted on the magnetic reproducer is the heart of Cinerama's synchronization system. Cinerama does not use conventional selsyn motors to keep the three projectors and sound in "locked-in" sync. Instead, they "fall in off the line." Each projector is equipped with a small "slave" synchronizing device similar in appearance to the "master" on the sound machine. In Fig. 2 a black disc resembling a strobe card with 32 white graduations can be seen. Each time this disc revolves, 32 frames, or approximately 3 feet of the film, pass through the machine.

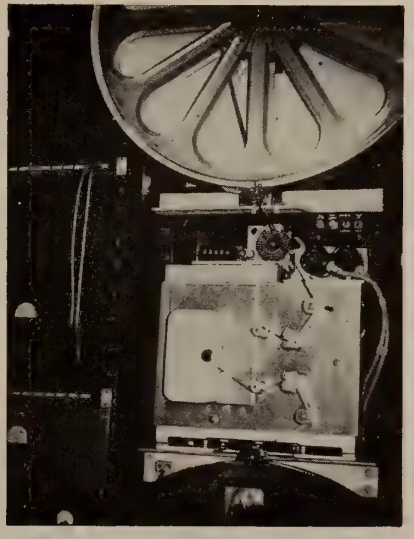
Maintaining Sync

At the conclusion of each revolution the device sends out an electrical pulse to the slave units on the projectors. If the latter are in sync, a green light mounted on each machine flashes momentarily. If one of the projectors is ahead or behind by as little as one frame, the light fails to flash. Instead, one of the two small (6-volt) synchro timing motors—visible in the illustration as the round black objects to the right of the disc—takes over and accelerates or retards the projector by the required amount.

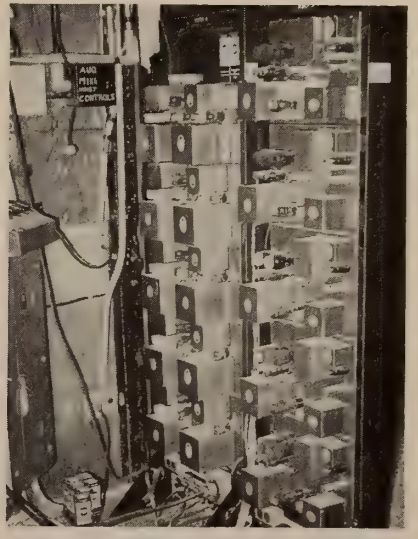
This gadgetry is especially busy at the start of the show. When the projectors are loaded, the films are synchronized on a common start-mark, perforation for perforation. The sound is started slightly ahead of the picture, and the projectors accelerate as required while 15 feet of leader run



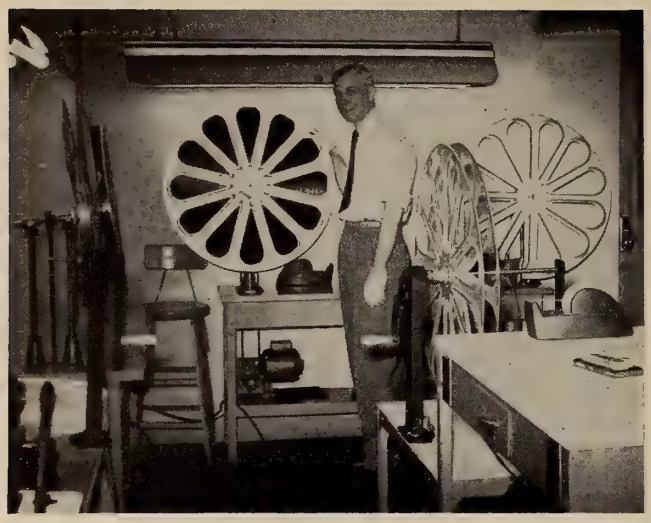
Ed Miller, resident engineer of Cinerama show in Detroit, takes a hand at console.



Seven tracks of magnetic sound on film are scanned by this reproducer.



Amplifiers: Booster at right, power at left—are rated at 75 watts per channel.



In the cutting room projectionist Joe Gates handles Cinerama's 31-inch, 8000-foot reel which, when loaded, weighs from 75 to 80 pounds. From the looks of these babies, projecting Cinerama would seem to be a job for a man with muscle.

through them, so that all four machines are in step by the time the picture appears and the dousers (arc-house shutters) swing open.

Since this sync mechanism is not completely foolproof, the green pulse-lights also appear on the console board in the center of the theatre, and the console operator can correct any projector from his control panel. We'll have more to say about the console later on.

To the left of the reproducer the preamplifier panel may be seen. The plug cords hanging down are used for "patching" in case one of the magnetic pickups should fail. That is, in case one sound track is not being reproduced, an adjacent track can be spread over two of the auditorium speakers to avoid a dead spot behind the screen. This also can be done from the console, as we shall see.

The Projection Booths

Leaving the sound room, we went downstairs to one of the projection booths—*Able*, to be exact, on the extreme right. The projectors are built especially for Cinerama. Though the arc-house and the basic casting are standard projection equipment, the interior of the head is drastically modified. For example, the frame size on standard 35-mm sound film measures 0.631 by 0.868 inches. Cinerama's frame is half again as high—with six perforations per frame instead of the usual four—and runs to the sprocket hole edges on both sides (since the optical sound track is eliminated). The resulting frame is slightly taller than it is wide—that is, 1.119 by 1.000 inches.

Further, there are the "jiggilos" on each side of the aperture to dodge out the sharp vertical lines which would otherwise appear between the three screen panels. These comb-like metal strips are cam-operated, moving up and down once per frame and remaining stationary while the shutter is closed. Jiggilos on adjacent projectors are 180 degrees out of phase. Because they generate considerable frictional heat in the aperture, which is already subject to arc heat, Cinerama projector apertures are water-cooled.

Oversize Reels

We have mentioned the 8000-foot reels used in the Cinerama process. Because the ordinary projector motor would not be strong enough to turn a full reel of this size, an auxiliary torque motor turns the takeup reel. And to counteract its inertia, the feed reel is equipped with a *brake*. All this film does not constitute a fire hazard, however, since Eastman safety film is used.

Because human vision is more sensitive to flicker in the peripheral area of the retina which Cinerama covers, the projectors are operated at 26 frames per second instead of the conventional 24. Combined with the taller frame, this results in a film speed of 146.3 feet per minute compared to the standard 90 for conventional 35-mm sound projection.

Sound System Backstage

After loading his projector and trimming his arc carbons, each projectionist flips a control switch from "local" to "remote," which turns over subsequent control of his machine to the console operator.

Next stop on our tour was backstage, behind the great curved screen. As we stepped out of a rear door onto the stage, the boards vibrated beneath our feet under the impact of the low-frequency "drivers." There are six banks of speakers behind the screen—one for the prolog projector, five for the Cinerama sequences. Each consists of two 18-inch, low-frequency reproducers ("woofers") and two exponential high-frequency horns ("tweeters"). All are Altec-Lansing equipment.

In the auditorium there are nine additional banks consisting of one woofer and one tweeter each. These are distributed as a left wall and right wall bank on each audience level, as well as a rear wall bank behind the audience on each level.

The booster and power amplifiers (Altec-Lansing models 126 and 247-B, respectively) for the stage speakers are located on the stage as close as possible to the speaker banks to avoid power and fidelity losses. Amplifiers for the side speakers are installed in the side projection booths (A and C) downstairs. The rear speaker amplifier is the center booth (B) and also serves as a standby amplifier for the composite track.

For audiophiles interested in the amplifier tube layout, the preamp for each channel (located in the sound room) contains a 1620 and 6SJ7; these are coupled into the booster stage (near the speaker) which consists of a pair of 1620's driving a pair of 6L6's in turn driving a pair of 807's in the power amplifier. The output transformer is the size of a small doghouse and the power rating for each channel is 75 watts, giving Cinerama a potential power output of nearly 600 watts! Needless to say, it has never been opened up—the building might fall down!

Faster Tape Speed

Another factor contributing to Cinerama's high fidelity sound (which faithfully reproduces frequencies from 30 to 15,000 cycles per second) is the linear operating speed of its magnetic tracks. While home tape recorders get along on tape speeds of 3¾ or 7½ inches per second, and hi-fi or broadcast equipment generally runs at 15 i.p.s., it will be noted that 146.3 feet per minute (which is the film speed) comes out 29¼ inches per second. You can put a lot of stuff on

(Continued on page 30)



Simplex dual in-car stereosound speakers shown mounted on special bracket, four to a post. One speaker is attached to each side of car for stereo affect.

Simplex Dual-Speaker Stereo Sound Available for Drive-In Theatres

HIGH-QUALITY sound distribution within the limited area provided by a car parked in a drive-in theatre has long posed a most difficult problem for designers and development engineers. Of late, these technical personnel have been engaged in offering to the drive-in patrons an approximation of true binaural hearing.

In the forefront of the technological ranks which accepted and successfully met this challenge to their abilities were, among others, the engineers of International Projector Corp. The result of this engineering and production talent is evident today in the Simplex dual-speaker system for drive-in theatres — a method whereby binaural reproduction is accomplished within an automobile.

In the Simplex system the three channels of CinemaScope sound are fed to both the No. 2, or middle, channel being split to serve both speakers with that degree of sound which gives balance. In addition to the double-speaker wiring and post equipment, a special "mixer" for combining the sound from the center track with left and right channels is required. Also needed are "penthouse" soundheads.

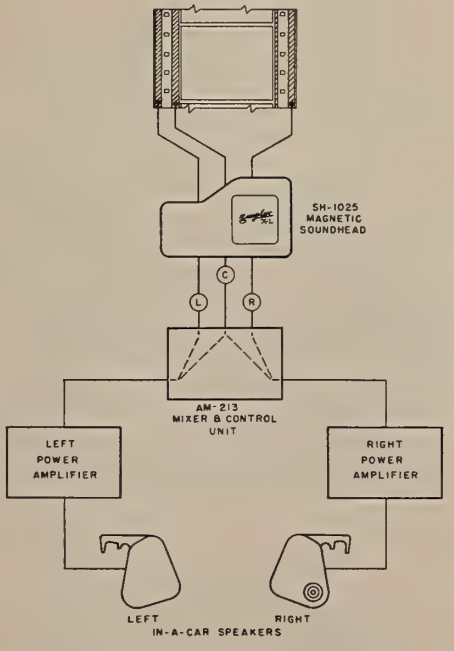
Once a drive-in has installed the Simplex system of stereosound, it can reproduce any type of sound now available. Its regular soundheads can handle standard optical sound or the Fine Perspecta system of optical stereosound, reproducing it in the standard one-channel way. In addition, the drive-in, when equipped with the Simplex system, will be able to reproduce CinemaScope magnetic sound.

Installation Modus Operandi

Now, in existing installations having a three-wire underground system, the Simplex unit may be used provided that the exhibitor is willing to sacrifice the individual speaker-stand light. If, on the other hand, an exhibitor wishes to "start from scratch" he may wish to install a four-wire underground system which will enable him to employ the dual-speaker arrangement and also retain his speaker-post light.

It follows, naturally, that new speaker-post brackets would be required to accommodate ("hang") the two speakers which would replace the single-speaker bracket formerly used. Any existing drive-in theatre having a minimum of three-wire underground wiring will, at the sacrifice of only the post light, be able to use this Simplex and similar drive-in systems. On a new project, it would seem to be the better part of wisdom to install the four-wire system which would accommodate a light for each speaker post.

Further detailed data anent any drive-in situation will be forthcoming promptly, at no charge, upon request to IP.



Graphical representation of the Simplex in-a-car speaker system which delivers stereophonic sound. Volume control knob is shown on the right-hand speaker.

DuMont's 19-Inch Color TV

A progress report on color Tv made by Du Mont Laboratories has disclosed a 19-inch color picture tube which delivers a picture almost equivalent in size to a 19-inch black-and-white tube.

Du Mont stated that the simplicity of the tube's design and its inherent picture clarity may bring mass production of large screen color television at a reasonable price within two to three years. This apparently means that the small screen color receivers presently being offered have been rendered obsolete.

The tube is called the Du Mont "Chroma-Sync Teletron." It has a 19-inch glass envelope with a round face plate and produces a picture of 185 square inches, more than twice the size of pictures of color receivers currently being marketed.

Universal's Profits Rise

Consolidated net earnings of Universal Pictures and subsidiaries for the 13 weeks ended January 30 last were $772,979, after provision of $800,000 for federal taxes. This figure represents the biggest Universal first quarter since 1946, and compares with $475,888 after $675,000 tax provision in the same period of the previous fiscal year.

Another Tv Extravaganza

David O. Selznick has signed a contract to produce a two-hour multi-network Tv show next October 24, marking the diamond jubilee of the electric light. The show will be the most expensive in the history of Tv, costing substantially more than the Ford 50th Anniversary show of last year, or the recent Rodgers and Hammerstein cavalcade sponsored by General Foods.

IN THE

SPOTLIGHT



Jim Day, Local 199, Detroit, had worked 652 Cinerama shows when this picture was made at control console which he is operating.

ONE of our boys—Jim Day by name and by affiliation a member of IA Local 199, Detroit—is currently enjoying a solid year-plus experience with Cinerama at the Music Hall Theatre in that famed Motor City. Jim is by way of being a mere amateur, since by the time these words appear in print he will have supervised 700 presentations of the intricate Cinerama showings.

Of blessed memory is Jim Day's observation that "there are no *chief* projectionists at the showings of Cinerama at the Music Hall Theatre. The men of our crew are *all* particularly well qualified to run Cinerama, or any other professional showing in the world."

Successful presentation of Cinerama in Detroit (as detailed elsewhere in this issue) or in any other city is dependent upon the teamwork of well trained crews and not on any one man. All of the men are experienced showmen.

For instance, Gary Lamb, console man on one team, joined Local 199 in 1916; Joe Gates, of this crew, 1921; William "Pop" Stolz, 1912; Michael Ureel, 1921; Marius Duffourc, 1912—about 190 years of experience between them. The other team consists of Glenn Harnden, 1918; Bruce Greenhaw, 1919; Matt Haskins, 1919; Ross Campbell, 1920, and Roy Light in 1929. A grand total of about 365 years of experience for the group.

Jim Day was console man for about 400 of Cinerama's 880 shows. He started with Cinerama in February 1953. A member of Local 199 since 1929, Jim has worked in various theatres in Detroit as projectionist, and on the road for Jam Handy. He was with Altec Service Corp. as sound engineer for about 6 years, and was also electronic technician on the large-screen Tv set-up at the Michigan Theatre, Detroit. He opened station WXYZ-Tv as projectionist and was with them for about two years. Born November 25, 1908. Got his first "ham ticket" for W8NJT in 1935, and has held commercial radio operator's licenses for years but never worked at it. Jim's family includes Mrs. Jim (Jackie) and one Cub Scout, Matty Day, 8 years old. Jim is a member of Daylight Lodge, F. and A. M., No. 525. Radio and quality sound are his hobbies. Since Ed Miller left to go back to Altec Service Corp., Jim has been working at Cinerama as resident technician.

• Local 332, Clinton, Iowa celebrated its 40th anniversary last month at a stag luncheon party which was held at the Labor Temple there.

• A recording of a discussion between Nelson Cruikshank, director of social insurance activities for the AF of L, and Andrew J. Biemiller, member of the AF of L national legislative staff, which helps to clarify the AF of L's attitude toward the government's social security proposals, is now available to all labor unions.

The AF of L representatives discuss each of the six points of the Eisenhower program, and they also explain the improvements recommended by the Federation. The record plays at 33⅓ rpm, runs 13 minutes, and costs $5.50 each. It may be obtained from the Workers Education Bureau, 1625 Eye St., N. W., Washington 5, D. C.

• One of the out-of-town visitors to the offices of IP the early part of this month was Anthony De Cosmo, business representative for Local 152, Hazelton, Penna. He had quite a gaff session with IP's editorial staff on the merits of the various projection processes now very much in the news.

• Following the expiration of the contract with Local 607, Kittanning, Penna., the owner of the Super 66 Drive-In Theatre refused to negotiate a new contract with the IA Local, and at the beginning of the present season employed projectionist members of the Construction Workers Union, which is affiliated with No. 50, United Mine Workers of America. Peaceful picket-



Members of the "Old Timers Club" of Music Hall Theatre, Detroit, Mich., as they gathered at the festive board in celebration of the first anniversary of the Cinerama showing at this theatre. This Club is comprised of employes who have been with the theatre since Cinerama first opened there in March 1953. Seated, left to right, are: Ross Campbell, Michael Ureel, Bruce Greenhaw, James Day, and Joseph Gates, members of Detroit Local 199. Shown at the extreme right is George Santer, house manager. Standing, left to right: Frank Upton, managing director; Betty Dolan, chief of service; William "Pop" Stolz, Local 199; Evelyn Hunter, ass't chief of service; Harry Pollack, Stagehand Local 38; Gary Lamb, Local 199; Si Finley, Local 38; William Loll, theatre treasurer; Jane Thom, ass't treasurer; Russ Russo, ass't manager; Adeline Messerschmidt, ass't treasurer; Mrs. Knapp, head cleaner, and William Green, director of publicity.

ing by Local 607 has been so effective that the theatre owner appealed to the courts for an injunction to restrain the IA Local. Local 607 maintains its right to picketing of the drive-in on the basis that workers from another jurisdiction have been brought in to replace IA men.

• Good news it is that Arthur Sullivan and Philip Levine, members of Local 96, Worcester, Mass., who suffered heart attacks and were hospitalized about the same time, have left the hospital and expect to be back at work within the next few weeks.

• Winning ski tourneys has become a commonplace with Jim and Bill Georgas, members of Toronto Local 173. Taking part in a number of important ski meets in Ontario, Canada, during the past season, the brothers Georgas took either first or second place in many of the events.

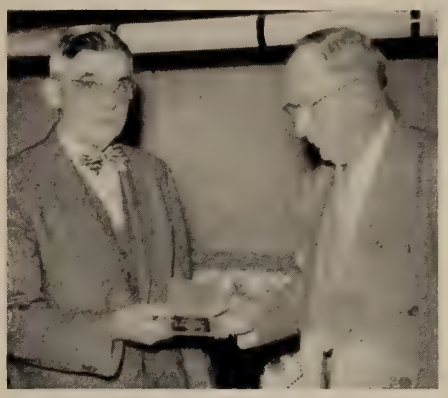
In the Huntsville (Ont.) meet, Jim copped firsts in cross-country, downhill, fourway, Alpine, and Nordic; second in slalom, and third in jumping. Competing in the very difficult run at Collingwood, Southern Ontario, he won the cross-country, Alpine, Nordic, and the fourway. He was second in slalom, and third in downhill. He is hopeful of making the Olympic team. At the same meet, Bill won first in downhill, second in Alpine, Nordic, and fourway, and third in cross-country.

To add to this excellent record, Jim and Bill Georgas rescued a skier who was lost and had been buried in the snow for several hours.



Jim and Bill Georgas, members of Toronto Local 173, hold many ski-jumping awards.

• Herbert F. Slater, Sr., business representative for Providence Local 223 since 1926, was honored at a surprise dinner given by the Local immediately following the April meeting. In appreciation of his successful stewardship of the Local for the past 28 years, Slater was awarded a gold life membership card. A tape recording entitled "This is Your Life, Bill Slater," accompanied by old pictures shown on a balopticon describing highlights of his life from infancy to the present date, was a feature of the party.



Philip Sugarman (left), vice-president of Local 223, Providence, R. I., is shown presenting a gold Life Membership card to Herbert F. Slater, Sr., business representative for 28 years.

• Claude E. Watkins, projectionist at the Strand Theatre in Troy, N. Y., and member of Local 324, Albany, N. Y., is a proud dad these days now that his daughter, Nancy, was elected to the national honorary society for home economics students, Omicron Nu. Nancy is a student at Syracuse University, where she is majoring in social work.

Watkins has been a member of the Albany Local since 1921 and in past years served as both president and business representative. In 1936 he was elected for one term as president of the N. Y. State Projectionists' Association. He has held his present position at the Strand Theatre in Troy for the past 33 years.

• Prize-winning suggestions in our final Polaroid-IP contest were submitted by George A. Hartnett, secretary of Local 286, Des Moines, Iowa. We hope he will enjoy the use of the Polaroid-Land camera awarded him for his suggestions.

Back in 1912, George Hartnett, together with several other projectionists, helped organize Local 286, which was granted an IA charter the following year. Since then he has served the Local as president, vice-president, business representative, and for the past 20 years has held the office of secretary. In 1933 he helped form the Iowa State Association, IATSE, serving as its secretary-treasurer ever since. For the past 21 years he has been auditor for the Iowa State Federation of Labor.

Fine Legislative Record

In the 1933, 1935, 1937 sessions of the Iowa General Assembly, Hartnett waged a vigorous campaign for the enactment of legislation providing for fireproof construction of projection rooms, and for other fire-preventive measures in connection with theatres. He authorized a booklet "Fire Hazards of Motion Picture Film," which was widely circulated among IA Locals that were conscious of the ever-present danger.

Born in Port Angeles, Wash., in 1891, Hartnett has made Des Moines his home since 1901. He has held his present position as projectionist at the Des Moines Theatre for the past 26 years. He is a veteran of World War I, having served with the Second Division in France and Germany. For the past 15 years he has been Legislative Officer, Department of Iowa, Veterans of Foreign Wars. He has a son, John, 18, now a member of the U. S. Air Force.

IA ELECTION

LOCAL 195, MANCHESTER, N. H.

Leo R. McIntyre, *pres.;* Arthur A. Smet, *vice-pres.;* Thomas P. Swist, *sec.-treas.;* Samuel F. Cooley, *rec.-sec.;* Arthur A. Smet, *bus. rep.;* Ernest Gunderman, Maurice Watts, George Nightingale, *executive board;* A. A. Smet, *del. to IA Convention.*



Lou Hammond, holder of No. 1 Seniority card in New York Local 306. Lou was for many years "Mr. Strand", by reason of having opened the Strand, Broadway, N. Y., first "presentation" house in the world.

Brush-up on Fundamentals

Rectifiers for Projection -- Conclusion

DURING one half cycle of A. C. voltage introduced to the selenium cell, its base plate is negative while the barrier is positive. At this instant free electrons converge upon the base plate which is a good conductor. These free electrons, under voltage pressure, pass through the thin selenium barrier to the contacting alloy on the other side; a current flows from the base plate to the alloy.

During the next half cycle, the base plate becomes positive and the selenium barrier negative. Ordinarily the flow of current would reverse but the barrier, being a very poor conductor, does not accumulate the quantity of electrons necessary for a flow from the contacting alloy through the barrier to the base plate. Since only half of the alternating cycle has been passed the output is a pulsating direct current. This entire action is shown in the simple schematic of Fig. 4A. We note at once the lack of requirement for an "A" potential as shown in Fig. 1 for the simple diode tube. This is a talking point for selenium versus the vacuum tube. Full wave rectifying circuits for these units may be set up in the same manner as described for diodes and as shown in Fig. 4B.

Operating Precautions

While projection rooms do not offer some of the hazards attendant on selenium rectifiers it might be well to pass along a warning or two. These units should not be installed in explosive atmosphere or where they will be exposed to mercury vapors. Adequate ventilation is always required. The stacked rectifiers should be mounted so that their fins are positioned vertically in free space to allow for heat radiation. No other heat producing equipment should be nearby. In surrounding temperatures of 110 degrees F. or higher the unit should be operated below its normal rating. This will prolong life and avoid trouble. While simple seleniums have no moving parts, most theatre-type units have a fan mounted at the top for forced air cooling. This permits operating at heavier current loads.

Do not use an ohmmeter to check a selenium rectifier. Its non-linear resistance will produce erroneous readings. A test voltmeter or ammeter will detect any abnormal conditions. If the voltage output is low and no overload condition has occurred, check the associated components as described later under "Trouble Shooting." The chances are that the rectifier itself is good. If not, the best thing to do is not to fool around with it. Get a new one. There is no more chance of local correction than there is with a blown vacuum tube. However, the manufacturer can rebuild the cells of selenium whereas defective vacuum tubes are useless. When voltage control is critical, inductive voltage regulators should be installed. The manufacturer will provide data on this.

Prolonged Overloading

Momentary overloading of current output should cause no damage to a selenium. However, a prolonged overload, such as a shorted load, will damage the rectifier. Overload breakers or fuses should be used. Locate the external short as speedily as possible and correct it before applying power to the rectifier.

Excessive voltage will cause damage. Watch the rating otherwise you're likely to cause a breakdown across the selenium barrier and ruin the unit. Seleniums are somewhat self-healing but miracles must not be expected. When a sustained over-voltage breakdown occurs, the odor of selenium fumes will warn the projectionist and give him a chance to shut off the power, and if he's lucky, switch to a spare rectifier.

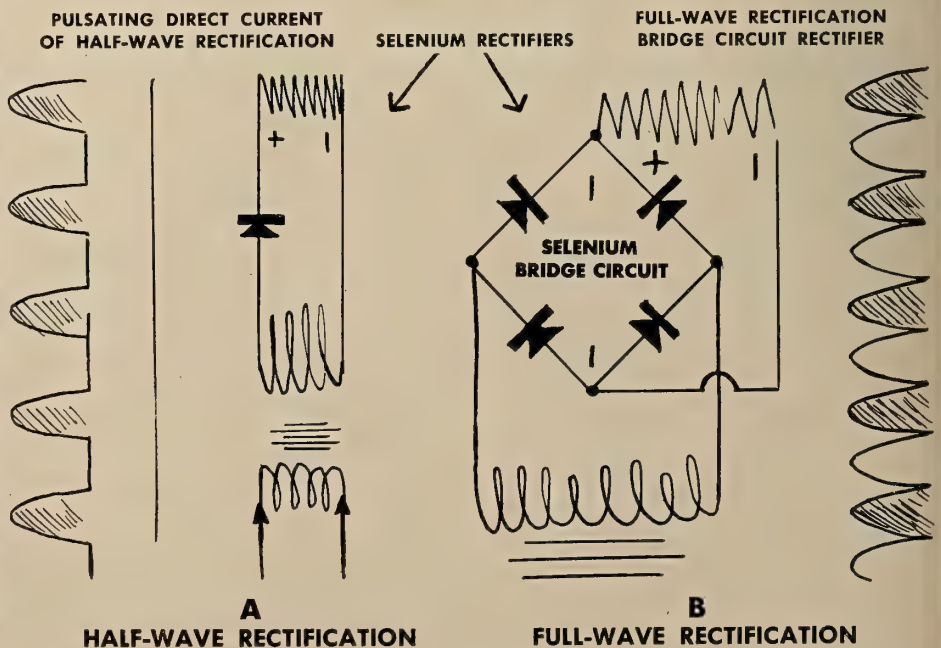
Filters

The basic rectifiying circuits described here produce a pulsating direct current. These pulsations represent the rectified alternations of the original AC current supplied to the rectifiers. It is generally necessary to smooth out these pulsations to obtain a more consistent or unvarying direct current. This is accomplished by means of filters comprised of chokes and condensers. These should be a part of the original installation. Primarily, filters utilize energy storage characteristics and the rise and fall of voltage is smoothed out and a steady output obtained.

Voltage Regulation

A five per cent drop in voltage output may be expected after the first few thousand hours of operation to a natural aging process inherent with selenium rectifiers. The drop, however, may be no greater than this even after 10,000 or more hours. To overcome this slight fall-off a tapped trans-

FIGURE 4



former may be used to boost the input voltage by the required amount.

Most rectifiers have some ripple content which, of course, is the reason for the filters. For a single-phase bridge circuit the ripple will be twice the frequency of the source, triple for three phase.

Trouble Shooting

Warning: Voltages developed within power supplies are, to put it mildly, injurious. In other words, you can be knocked head over heels. Shut off power before attempting any service within one of these units.

Filter condensers hold a considerable charge for a month or more if there is no leakage. Thus the better the equipment the greater the danger. Such storage voltage in the higher voltage television units has caused fatalities among servicemen. Before going ahead with any work be sure to discharge each condenser terminal to ground by securing wire jumper first at ground and then applying the other end of the jumper individually to each condenser terminal.

Diode tubes are something else again. They can be checked quite easily by the simple expedient of substitution, using a new tube each time. Never install a different type or rating of tube unless the service engineer or the manufacturer's manual sanctions it. If trouble persists, check the chokes, filter condensers, bleeder resisters and wiring. If a component is scorched or carries an odor of burnt insulation, replace it. The same holds for wiring. Insulation must be good between chassis ground and condensers and resisters. Check with an ohmmeter or continuity meter. No through circuit should be indicated. Replace any condenser showing any signs of internal leakage.

Fairchild's Sound Division

The Perspecta system of recording and reproducing sound received a fresh and powerful impetus during the past month with the announcement by Fairchild Recording Equipment Co., of Whitestone 57, New York, of the establishment of a special Motion Picture division to manufacture, sell and license this new process. Fairchild is a famous name in the field of precise instruments, including the world-famous Fairchild aerial photography cameras.

Delivery of the first "integrator" units for the Perspecta system, developed by C. Robert Fine, is now progressing. The Perspecta system is the first "compatible" theatre sound system which permits reproduction of three-speaker stereophonic sound from a single optical track, or via the conventional one-speaker setup. M-G-M and Paramount, among others, have announced the availability of Perspecta prints for all future releases.

Perspecta requires no variance in standard projection procedure — in fact, Perspecta film may be spliced into conventional film, and the switchover is automatic via the "integrator".

Ray Crews, in charge of this new Fairchild division, formerly supervised sound recording at Paramount and was at one time manager of the Westrex subsidiary division.

Dubbing in English

Shortage of film product, resulting in an increased demand for foreign-made pictures in American theatres, has started a trend to dubbing in the English dialogue. Dubbing American films in foreign languages has long been a practice in Hollywood.

It is pointed out that most foreign actors speak English to a greater or lesser extent but that their accents make their voices unacceptable to audiences here. By speaking their lines in English, even if badly spoken, for the cameras the actors at the production centers abroad make it simple to do the dubbing here and still maintain proper lip sync.

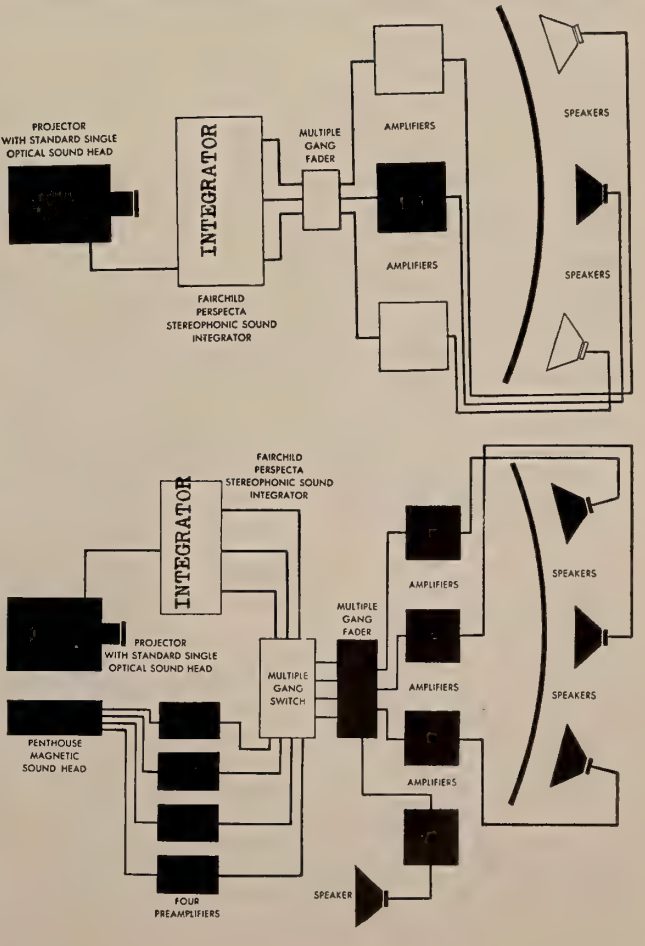
Projector, Lens Cleanliness a Magnetic-Film 'Must'

The reproduction of magnetic soundtracks poses a problem for projectionists that has received no attention—the depositing of the iron filings with which magnetic prints are treated all over the projector, including the back end of the lens, during the film-transit from the upper magazine to the penthouse reproducer, to the head and on to the lower magazine.

This condition may be caused by the air current set up by the rear shutter, or by the constant stream of air produced by the use of an air-cooling blower, or by a combination of both.

Absolutely required: the constant cleaning of the projector and the removal of the gate at least three times daily in order to remove these deposits from the lens.

The failure to perform this work is due to lack of manpower in many projection rooms, the penalty for which is a most unsatisfactory screen image.



Here is a graphic representation of the Perspecta (Robert Fine) single-optical track system of recording and reproducing sound. Paramount is definitely committed to this system for all future releases, and M-G-M is going along.
This Perspecta sound system incorporates on a single optical track, 100 mills wide, the means for reproduction in the theatre of either the stereophonic effect through a 3-horn setup, if available, or the straightaway sound reproduction through a single horn. The economic and technological appeal of the Perspecta system is that it can be shown in any theatre in the world with existing, standard projection equipment without a nickel's extra expenditure. As shown here the existing equipment (prior to the Perspecta installation) is indicated in the black areas.

What's Your Problem?

Projectionists whose problems appear herein will each receive a $5.00 check from IP. What's YOUR problem?

QUESTION. *We have Simplex-Hi lamps operating off two separate 4-bulb, Tungar-type rectifiers, rated at 40 amps., 27 volts. Each lamp has an ammeter but no voltmeter. Recently one of the lamps developed trouble which we have been unable to overcome.*

The current reads in the vicinity of 25 amps., and the automatic carbon feed is very erratic. The usual tendency is for the carbons to drift toward the front of the lamphouse, with the gap becoming very short; sometimes the carbons run together.

On an average of about one nightly, however, the carbons pull apart and we lose our light. I feel that this trouble may be due to the Tungar bulbs, which are old, or to high resistance in the leads from the rectifier to the lamp. I would appreciate your opinion on this.

KENNETH G. ALLEY
IA Local 421, Herrin, Ill.

ANSWER. Your difficulty may result from defective Tungar bulbs. In this type of rectifier two bulbs are paralleled through a load-dividing transformer on each half wave of the rectifier output. If one bulb becomes defective or operates intermittently, it throws an overload on the remaining bulb on that half of the wave. This tube will consequently overheat, and in addition the arc voltage will become reduced 2 to 3 volts, which will cause the arc gap to shorten and occasionally cause the carbons to run together.

A check to see that all tubes are operating can be made by holding a small mirror down along the sides of the tubes and looking at each tube in turn from the side to determine whether there is a blue flame between the anode and filament of each tube. This bluish flame indicates that the tube is rectifying. Any tube not found to be rectifying should be removed and a replacement inserted.

Incorrect Ammeter Reading

A second possibility is that the ammeter may be reading incorrectly. You report that sometimes it reads approximately 25 amperes. The natural inclination of most projectionists would be to accordingly turn up the rheostat to get more current.

This, of course, would cause the carbons to be fed faster, and the current would go up, thus causing the positive carbon to burn faster in relation to the negative than the design of the lamp contemplated. As a result, the entire arc gap would drift forward toward the front of the lamphouse and become rather short. Then, if the carbons actually freeze, the crater is destroyed and the lamp would very likely go out.

Resetting Motor Feed Rheostat

We would suggest resetting the motor feed rheostat, reducing the setting until there is no further drift of the arc toward the front of the lamphouse, and also increase or decrease the rectifier setting to obtain the correct arc gap.

If the gap is longer than the approximate 1/4th inch, the rectifier tap switch should be set at a lower point. If the arc gap is shorter than 1/4th inch, the rectifier tap switch should be set up to a higher tap.

Hilux F:1.8 Lenses Now In Volume Production

The ready and widespread acceptance being extended to its new F:1.8 Hilux projection lens is due to a variety of compelling reasons, states its manufacturer, Projection Optics Co., 330 Lyell Ave., Rochester, N. Y. This upsurge in orders has necessitated additional manufacturing facilities.

Projection Optics cites the following reasons for the Hilux lens demand: 1. Speed—F:1.8; a new anastigmat formula; one piece hermetically-sealed mount; no cement failure—no re-cementing; all air-glass surfaces precoated; minimum vignetting, and maximum screen brightness.



Projection Optics' new Super-Lite Hilux F:1.8 wide-angle lens

The Hilux lens series, designed especially for maximum edge-to-edge definition for wide-screen applications, are at present available in focal lengths from 2 to 3½ inches, with more to come. The price of these new lenses is $270-and-up per matched pair, through theatre supply dealers. National distributor for the Hilex lens is Raytone Screen Corp., 105 Clermont Ave., Brooklyn 5, N. Y.

British Film Tax Reduction

The Chancellor of the Exchequer, in his Budget Speech on April 6, 1954, in the British House of Commons, announced a reduction in motion picture theater entertainments duty. It is estimated that the reductions will cost the Exchequer about 3,500,000 pounds sterling a year. The reduced levies go into effect from May 30, 1954, and provide reductions in duty ranging from a half-penny on the lowest priced tickets to 1½ pence for admissions of 4 shillings. Theater seats up to and including 9 pence will be free of tax, whereas the present tax rates exempt tickets costing up to 8 pence. (One pound sterling equals U. S. $2.80, there are 20 shilling to a pound, 12 pence to a shilling.)

The tax reduction will not result in lower admission prices. In effect the tax reduction will be absorbed by the film industry and will be shared between exhibitors and producers. Immediate trade reaction to the tax reductions was one of surprised approval.

Film Biz in the Antipodes

During 1953 there were imported into Australia a total of 400 feature-length 35-mm films. Of these, 287, or about 72% of the total, were U. S. films, 68 were British, and 45 were from other countries. One Australian film was released in 1953. This compares with a total of 390 feature films imported in 1952, of which 290, or about 74% were U. S. films, 72 British, and 28 from other countries.

Of the 401 feature-length films passed for commercial exhibition, 292 were classified as suitable for general exhibition, and 109 as not suitable for exhibition before children under 16 years of age. Only one feature film was rejected in 1953.

Pola-Lite for Foreign Use

Negotiations have been completed for the manufacture and distribution of the Pola-Lite single film 3-D system in the United Kingdom and Canada. G. B. Kalee, Ltd., will manufacture units for distribution throughout the United Kingdom and British possessions, Europe, Latin and South America.

In Canada, the Pola-Lite units will be distributed by General Theaters, a division of Famous Players Canadian Corp.

LETTERS TO THE EDITOR

To the Editor of IP:

Being intensely interested in the topic of all-purpose screens for the new processes, I should like to append a few observations thereon.

There is, without doubt, a trend to the installation of screens with seamless construction or a construction that effectively makes any seams invisible. Today's wide-angle photography utilizes large panoramas, very often showing large areas of sky, desert, snow, etc. In such instances seams are particularly objectionable.

In addition, a uniformity of surface is required, thereby eliminating such light seams perfect and therefore any streaks or shades.

The question of light distribution has been given quite a going over. Once again we notice a trend toward screens with higher brightness and better definition for the *best parts* of the theatre, the exhibitor being satisfied in the majority of cases with the inferior light distribution in the very front seats to the extreme sides. His preference is a natural one since he does not want to sacrifice quality of projection for the benefit of the only seats in his theatre that cannot always be filled and which have undesirable viewing angles.

The screen manufacturer is faced with the problem of evaluating the more important features of his all-purpose screen. The older and well established screen manufacturers seem to prefer uniformity of surface and good definition to features that would be detrimental to such results.

LEONARD SATZ
Raytone Screen Corp., N. Y. City

To the Editor of IP:

In view of the current confusion on the subject of splicing CinemaScope film, I submit the following:

All it requires to make a good splice in *any* film is a good film cement and a little common sense. I think it is a smear on the capability and intelligence of the projectionist to suggest that he will have trouble splicing CinemaScope or any other type of film. If he is capable of operating the equipment they throw at him today, he surely is capable of splicing film, regardless of type.

I am enclosing a small block of wood 1/2-inch square. You will note that it has a piece of sandpaper glued to two sides. This little block, which any kid could make, serves as a dry emulsion remover and a roughing block to rough the splice area on *both* the emulsion and shiny side of the film. The block is used *with a light touch* and does a good job. The wire brushes that someone has recently been trying to sell projectionists are not needed.

At our laboratories we have tried just about every method of preparing a film for splicing, and we find that these little blocks really do the job. We have sent a quantity of these blocks to our dealers, they were very well received. Some manufacturers of raw film stock tell you not to use sandpaper. They claim that it will cause damage to projector parts and get on the film, causing scratches. This we firmly disbelieve.

We believe that if a splice is made right and a good film cement is used, there will be no problem in splicing film and, I've made a lot of splices in my day.

As you probably know, I own the company that makes Ethyloid film cement. Our business has increased 40% in the past year, and we have had no complaints about splices pulling apart. Ethyloid is the standard cement in all Hollywood studios and cutting rooms as well as the Army and Air Force motion picture service. About a year ago we lost a couple of our largest film exchange customers. Today they are back using Ethyloid as before. We ship to 20 European countries.

R. J. FISHER
President, Fisher Mfg. Co.,
Rochester, N. Y.

To the Editor of IP:

I assume that many a projectionist lost sleep after reading C. J. Williams' article on page 30 of IP for February, entitled, "Big Future Seen for New Giant Magazine." The large reels were forced upon us as a necessity for projecting 3-D. We took them in our stride and did our utmost to put on the best show we knew how.

Now comes a gentleman who doubtless never struggled with these "hernia givers" tells us that they are practical in use, and decrease the possibility of a bad changeover by 50 percent. He should work on a shift with 55-minute reels for a couple of weeks, and then make this statement. As to better changeovers — what excuse has a man for not making perfect ones every time? That's what he gets paid for!

Not only are tension adjustments more critical with oversize reels, but the least bend in a reel causes uneven pulldown, making it necessary at times to stand and hold the reel so that the film won't be snapped. The heat factor from continuous running is very injurious to projector parts. Things happen that were unheard of with 2,000-foot reels. As an example, we had a lamphouse gear bind up from the built-up heat.

JOHN W. MAUTKE
Local 337, Utica, N. Y.

PARAMOUNT PICTURES CORPORATION
WEST COAST STUDIOS
5451 MARATHON STREET — HOLLYWOOD 38, CALIF.

To the Editor of IP:

. . . Frankly, I have felt all along that the final answer would come in some simple presentation of the motion picture on the screen, one that would be adaptable to all theatres and one in which the cost would not be exorbitant.

We here at Paramount have never felt that stereophonic sound solved the problem in any way, and, of course, have never accepted the principle of stereophonic sound—except we have elected to have one optical sound track on our pictures so that those exhibitors desiring to obtain a stereophonic effect may do so. As you know, they can run the same print with existing standard equipment.

Height of Utmost Importance

We have at all times stated that height was as important to a picture as width. I think your stand has been exactly the same as ours. We agree with you that a picture can be projected successfully on the proper size screen 2-to-1. You, as a projectionist, know that the audience will hardly be able to distinguish between 1.85-to-1 and 2-to-1, especially on a large screen.

It is our feeling that we get a better picture in the VistaVision process when composing it in the ratio of 1.85-to-1. We certainly believe the picture can be well presented and little difference can be noticed when the same print is projected 1.66-to-1.

As I stated in New York, the VistaVision pictures we are making may still be projected on the screen 2-to-1 and maintain all the VistaVision values.

Y. FRANK FREEMAN
Vice-President, Charge of Production

Re-Opening The Drive-In

This is the second and final installment of this article which details the requisites for the proper refurbishment and subsequent efficient operation of the drive-in theatre, projection-wise.

Lamphouse Optics

14. LAMP OPTICS. Mirrors and condensing lenses must be taken out of the lamphouse for thorough cleaning. The very gentlest handling of these optical elements is the best protection against accidental breakage. Approved cleaning methods for lamphouse optics have already appeared in IP. Damaged and defective mirrors should be replaced without delay.

The projector optical train may now be lined up by any of the usual methods — passing an aligning rod or stretching a string through the optical centers until the generator or rectifier has been checked.

15. GENERATOR OR RECTIFIERS. Check the condition of the ballast rheostats and their connections. When the current-supplying device is a motor-generator set, proceed as follows:

Turn the generator over by hand to note the "feel" of the machine. Carefully blow out all the dust from the interior. Examine the commutator and the brushes for wear and defects. Clean the commutator, scrape away all dirt from the mica spacers between the copper bars, and dress the commutator by applying a *mere trace* of petroleum ("Vaseline") to its surface. Correct improper brush tension.

Grease the generator per manufacturer's instructions. Run-in the generator for 30 minutes before drawing current from it.

If the current-supplying outfit is a rectifier, clean the cabinets and note the condition of the chemical stacks, blower motors, *etc.* In the case of tungar-type rectifiers, test all tubes for plate current and replace the weak ones.

Pre-Show Light Test

All switches not previously examined should now be checked. Familiarize yourself with the switchboards, fuse blocks, *etc.*, and replenish the supply of spare fuses.

16. LIGHT TEST. Burn-in a new trim of carbons in each lamp. Adjust the arc-feed mechanisms to maintain the correct arc gap.

Project blank light to the screen. (Guard against lens injury by running the projectors, if rear-shutter models, and employing only brief flashes of light for the test.) Adjust the reflector for the most uniform screen illumination, and adjust arc-mirror distance to obtain the brightest light. Now adjust the arc-indicator so that the image of the positive crater coincides with the line on the arcoscope card.

Adjustment of mirror-aperture distance may be necessary in some cases, especially when the light output of the projectors is not balanced.

With the lens-holder of each machine loosened and the focusing carriage in midway position, move the lens in or out by hand until a sharp image of the aperture edges is projected on the screen. Then carefully pull the lens out toward the screen until the aperture image is only *very slightly* blurred. Tighten the nuts of the lens-holder with the lens in this position.

If necessary, make pedestal adjustments so that the projected fields of both projectors coincide on the screen. Mentally note desired changes in the placement of the screen masking battens.

Screw, Picture Test

17. SCREEN AND CURTAINS. Make the necessary changes in the screen masking and note the condition of the screen. Dust spots may sometimes be brushed away with a soft brush or clean cloth.

Check grand-drape and title-curtain controls, and ascertain the closing time of the title curtain — information needed for "cueing" films.

Check striplights, footlights, *etc.*, for burned-out bulbs and bulbs of the wrong size or color. Make certain that all projection and observation port glasses are of the best quality and *scrupulously clean.* (See "Emphasis on the Port Side" by A. Buckley, IP for January, 1949, p. 12.)

18. PICTURE TEST. Use a good quality print for test purposes. Before threading up, however, check the timing of the occulting shutter. Bring

The Fair-Haired Boy:

Wide-Angle, Short-Focal Lenses

There is no question but that high-level policy decisions made in the last month point dramatically to a large screen image having not only width but height. We in the projection field know that this type of screen image may be achieved only by the use of a wide-angle, short focal-length projection lens.

Comes now a challenge to American optical designers in the form of a "Super Kiptar" lens made by the world-famous Schneider Optical Co. of Gottingen, Germany. These lenses are in the best tradition of German optical technology. Significant is the fact that these lenses are produced in one-fifth steps from 2.0 up to 3.80 at a speed of F:1.9. A new series of lenses now under development will extend considerably this range of focal lengths. These Super Kiptar lenses constitute an interesting departure from the time-honored Petzval-type lens which has served the projection field so long and efficiently.

The usual aplanatic, or Petzval-type lens gives superior performance only inside a field of view not exceeding 10 of 15 degrees. The Super Kiptar, a double anastigmatic lens, would seem to give a clear field of approximately three times as great, namely, 30 to 45 degrees. This wide field of view which gives a "flat" field is ideally suitable for wide-screen projection.

The chief difference between the Super Kiptar and other widely-used double-anastigmats is that the front internal couplet of the former does not have cemented components — a question which will continue to evoke considerable controversy in projection circles.

The three great families of projection lenses — the Petzval aplanats, the anastigmats, and the double-anastigmats — will provoke as large a variety of opinion as there are projectionists. As always, performance under actual field conditions will provide the answer.

the manual shutter adjustment to the midway point. Free the shutter on its shaft. Place a reference marker over any tooth of the intermittent sprocket when at rest. Turn the mechanism by hand, and when the second tooth from the first comes under the marker, turn the loosened shutter to mid-occultation position. Tighten the shutter screws. (See adjacent boxed comment on shutter blade width.)

Set the framer midway and thread up the reel of film. Project the picture and sharpen focus and framing adjustments. Note carefully any defects which require correction — the adjustment of the lateral guide rollers, for example. (There is no need for sound during this test.)

Sound Reproduction Check

19. SOUND SYSTEM AND SOUND TEST. It is assumed here that the complex tests and adjustments necessary in connection with the sound system will be made by a sound service engineer. The projectionist not having the benefit of sound service ordinarily must rely on the usual circuit- and tube-testing methods. The focus of soundhead optics may be set by the "flicker-test" method. The lenses of the optical tubes must be cleaned from time to time, of course, but care should be taken not to disturb the focus.

A final check-up on the sound may be conducted by running films in both projectors simultaneously and switching the fader back and forth to determine whether the output level of both machines is the same. The closeness of the "match" should be within ½ db. Sound quality, particularly the clearness of the higher tones, should be checked from the auditorium.

The correlation between correct "average" auditorium and projection-room monitor volume levels may now be established.

All is now in readiness for a com-

(Continued on page 30)

Fox Nets Large 1953 Profits

Earnings of $4,560,887 have been reported by 20th Century-Fox for 1953. compared with $2,178,117 in 1952. The company set a record in 1953 in both foreign and domestic film rentals. The total for both was $105,662,000, an increase of 13.4% over the total $93.-167,000 for 1952.



Your patrons will notice the difference! Super Snaplites give you Sharper Pictures, More Illumination, Greater Contrast and Definition.



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Film Biz Thrives on Confusion — *or Does it?*

APPARENTLY there is nothing like turmoil to bring the motion picture business out of a rut. Often billed as one of the few industries that can afford the luxury of one crisis after another, the film trade is now marking gains on various financial fronts. (1) Profits are better generally than in the last several years. (2) Companies have tightened operations and in many ways achieved a more realistic economy. Official reports from circuits and distributors show that audiences are growing. (4) Achieved tax cuts on admissions represent another plus.

The film colony's fascination with, but uncertainty about, the new "scopes" appears an example of where confusion breeds coin. For all seem agreed that Cinerama, CinemaScope and, in certain instances 3-D, have stirred new public interest in the entire Hollywood output.

Following is a roundup account of the moneymaking behavior of the principal film and theatre companies:

COLUMBIA—Net earnings jumped to $1,910,000 for the 26 weeks ended last Dec. 26, from $247,000 in the corresponding period a year ago. Studio embarking on a substantially more elaborate production program whose cash requirements likely will rule out possibility of an upped dividend for at least the next six to nine months. Gross business appears rising to $67,000,000 for fiscal 1954, or a gain of over $6,000,000 in comparison with 1953.

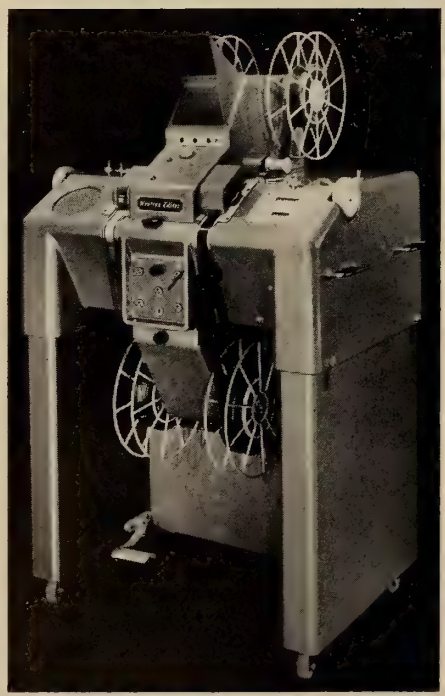
LOEW'S—Possibility here of upped divvy within the next six months. Company in June of 1952 cut its distribution to stockholders to 20c quarterly per share, from 37½c. Saving $2,200,000 this year via trimmed pension plan for employees. Earnings for first 1954 quarter went up to 22c per share, compared with 6c in first quarter of 1953. Very strong financial structure. Production inventories now at a low point, influencing decision to step up rate of film-making by eight productions this year.

NATIONAL THEATRES—1953 net was $2,515,000, or 91c a share, compared with $1,877,000, or 68c per share in the previous fiscal year. Attendance dropped 6% and theatre income was off 1% in consequence of NT's divestature of 31 houses, cutting the total to 385. Economies accounted for the earnings upbeat. $1,100,000 shelled out for CinemaScope equipment in 83 situations, and total expenditure figures to climb to

"Confusion breeds coin" says the appended excerpt from a recent issue (March 31) of "Variety," the bible of show-business. IP agrees with this statement only to the extent that confusion induces the stimulus for the desperately-needed technological advancement, particularly in terms of industry-wide agreement upon reproduction standards.

$4,000,000 for entire chain. Continued earnings improvement in prospect.

PARAMOUNT—Wall Street estimates place 1953 earnings at $2.90 per share on gross business of $108,000,000. 1952 net was $2.52 per share, gross was $104,800,000. Annual $2 divvy rate has been maintained since company formed in 1950 via divorcement reorganization. Appears definite to continue. Diversified interests include heavy participation in DuMont Labs, Telemeter (coinbox Tv in homes), Chromatic Labs, and ownership of station KTLA in L. A.



Here is a Westrex 35-mm editing machine made available late in 1953, which won a special Academy award for its design, construction and performance. Even prior to this award, this film-editing unit won wide acceptance by all the major Hollywood studios.

RKO PICTURES—Strictly downbeat now, future plans unknown. Howard Hughes offer to buy out entire assets at equivalent of $6 per share still pending. Strongly indicated it will go through (trading price on the N. Y. Stock Exchange has been $5.87½ per share). First nine months of 1953 resulted in deficit of $3,740,000, compared with loss of $4,777,000 in same period of 1952. Some stepped-up production is indicated in tieups with indie film-makers. Hughes, personally, simply unpredictable.

RKO THEATRES—Total income for 1953 up to $34,075,000, from $31,521,000 in previous year. Policy of selling unwanted (meaning unprofitable) properties caused a net loss of $296,600 for the year. Chain took a loss of $1,205,800 on sale of two houses, two real estate properties. Two theatres leased to other interests. Now has 82 theatres, 58 of which have been equipped for CinemaScope. Spent about $1,500,000 on these installations over last year.

STANLEY WARNER—First divvy (20c per share) was paid in January. Earnings for first 1954 quarter hit 21c. No comparisons available but all of 1953 brought loss of 17c per share. Strong upbeat for balance of this year looks for sure. Tieup with Cinerama shaping as important income source. Possible is another cash distribution to stockholders within next nine months.

20TH-FOX—Special divvy of 10c per share declared along with regular 25c payoff for first 1954 quarter. Strong cash position and lessened capital requirements because of fewer productions prompted board action authorizing purchase of 100,000 shares of company's own stock at prevailing prices on N. Y. Stock Exchange beginning April 15. Earnings for 1953 (calendar year) jumped to $4,560,000, or $1.65 per common share, for a gain of over 100%. Has strong competitive edge in C'Scope market, but continued loss of many theatre outlets must be reckoned with if C'Scope licensing conditions are continued.

UNITED ARTISTS—Indie company makes no public disclosures re finances. But reliable sources indicate volume of business more than doubled in last two years. Understood all profits being poured into company fund for financing production, rather than split among limited partnership group. Heavy coin coming from quantity of product (four releases a month) and not alone a few tall money-making pix.

UNITED PARAMOUNT—(American Broadcasting)—Despite the lopping of 39 theatres over the year, operating income of $114,926,000 for 1953 was just

slightly under the previous year. As of start of 1954, chain comprised 669 situations. ABC division showing improvement but still for all of 1953 was a deficit operation. Consolidated net for 1953 amounted to $8,996,000, including $4,480,000 from operations and $4,516,000 from cap gains, equal to $2.14 per common share. No per-share comparison available due to changes in capital structure of circuit as now amalgamated with ABC. Program of C'Scope installations is listed as a $6,000,000 expenditure.

UNIVERSAL—Excess profits tax nicked U for 45c per share last year. With this levy now removed, monetary picture still further brightened. Net of $772,979 for the 13 weeks ended last Jan. 30 was highest quarterly report in eight years. Extra 25c dividend was voted last December along with 50c regular. Another 25c special is looked for in not too distant future. U has been steadily on monetary upbeat for the last five years.

WARNER BROS.—Now appears gaining ground following setbacks stemming from domestic theatre divorcement. For 1954 fiscal year, which ends Aug. 31, profit at $1.60 per share foreseen by some analysts. 1953 net was $1.17 per share, exclusive of capital gains. Divvy rate holding at 30c per quarter.

PERSONAL NOTES

THOMAS W. HOPE has been appointed assistant advisor on non-theatrical film at Eastman Kodak. Hope is well known in the audio-visual field. Since 1945, he has been manager of the film department at General Mills, Inc. In his new post he will assist John Flory, Kodak's advisor on non-theatrical films.

ADOLF R. SCHWARTZ, managing director of Westrex Australia Pty. Ltd. for the last two years, will leave there for Bombay in August to assume a new post as manager for Westrex in India. William E. Kollmyer, presently manager in India, will return to New York early in September. He will be assigned to the post of managing director in Australia after taking his home leave and undergoing a period of special training at headquarters in New York.

ROBERT J. CARRINGTON has been appointed advertising manager of the Altec Lansing Corp. Carrington will make his headquarters in Beverly Hills, Calif., where the Altec Lansing manufacturing plants are located.

GLENN M. PINCKNEY, of Altec Service Corp., was tendered a testimonial signalizing 25 years of service with Erpi and Altec on April 30th. The affair honoring Pinckney was held in the offices of Altec's eastern division, Newark, N. J., where he served for several years as branch manager.

Kodak Film About Lenses

"Quality in Photographic Lenses," a 16-mm Kodachrome motion picture produced by the informational films division of Eastman Kodak Co., received a "Golden Reel" award in the first annual selection of 16-mm "Oscars" by the Film Council of America.

IA OBITUARIES

ABE LANG, 60, member of New York Local 306, died suddenly on May 1. For the past 10 years he worked as a projectionist at Paramount News. In the early days of sound, Lang spent a great deal of time traveling all over the country supervising the installation of sound equipment for ERPI. He was a member of Dirigo Lodge No. 30, F. and A. M. He is survived by his wife, Maude, two brothers and two sisters.

FRED W. NEWCOMB, 71, member of Local 223, Providence, R. I., died last month after a short illness. He joined the Providence Local back in 1901 and for 40 consecutive years served as a delegate to IA conventions. For the past 20 years he was secretary for the Third District, IATSE. Many prominent members of the labor movement attended his funeral. The honorary bearers were James E. Brennan, 1st IA vice-president; Herbert Slater, Philip Sugarman, and Fred Coates, members of Local 223, Providence, and Gerald H. Payne, Local 538, Westerly.

JAMES J. GORMAN, 64, president of Local 110, Chicago, Ill. for the past ten years, died last month. At the time of his death he was chief projectionist at the State Lake Theatre in Chicago. He is survived by his wife, two sons, and a daughter.



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Color 'Sensation' vs Color 'Stimulus'

FOR a proper understanding of the anatomy of color we have to distinguish between the conceptions of "color stimulus" and "color sensation," reports the *Philips Technical Review*, Philips Laboratories, Eindhoven, Holland. A color stimulus is the subject of technical color measurements. It is entirely different from color sensation, which is sometimes indicated merely by the word "color" as applying to the subjective sensation of the observer.

The fact that a given color stimulus may give rise to different color sensations is ascribed to a change in the retina of the eye under the influence of light. This phenomenon is termed "chromatic adaptation" and it greatly affects the impressions we obtain from our surroundings.

'Sensation' and 'Stimulus'

The color sensation we get from an object in our surroundings depends upon the following three groups of causes.

(a) The spectral composition of the light that the colored object throws upon the eye.

(b) The "normal" laws of additive color mixing of the eye, *i.e.*, the laws governing the results of additive mixing of colored light for the normal eye under standardized conditions.

(c) All sorts of incidental circumstances affecting the state of our organs of sight at the moment.

The result of a technical measurement of color is called "color stimulus," which depends only upon the factors *a* and *b* aforementioned.

Factors Affecting Vision

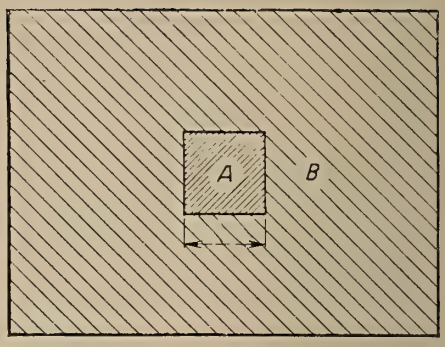
The circumstances affecting the color of a beam of light of given physical properties come under the following headings:

(1) Characteristics of the eye of the individual observer.

(2) Properties of the objects viewed which evoke physical influence, *i. e.*, memory.

(3) The state of the retina, which is affected by other light impinging upon other parts of the retina while the beam from the object is under view, or by such other light as may have just previously reached it.

It might be considered ideal to possess a complete set of specifications for predicting the nature of a color sensation from the various physical conditions. As, however, a color sensation is difficult to express in numerical terms and, moreover, depends upon so many circumstances, some of which are of a non-physical nature, such an ideal can never be fully realized.



The chromatic adaptation of the eye is very well demonstrated by illuminating a transparent window (A) with a light of a certain color and the surrounding field (B) first with artificial daylight, for instance, and then with incandescent light. Shortly after changing over from daylight to lamplight the eye directed upon (A) sees a change of color in the window in the center of the diagram.

Thanks to the simple normal laws of additive color mixing of the eye, it has been possible to draw up complete specifications for the measuring of color stimuli, so that now there are tables enabling one to calculate a color stimulus from the results of purely physical measurements, without any recourse to visual judgment.

Color Sensation Characteristics

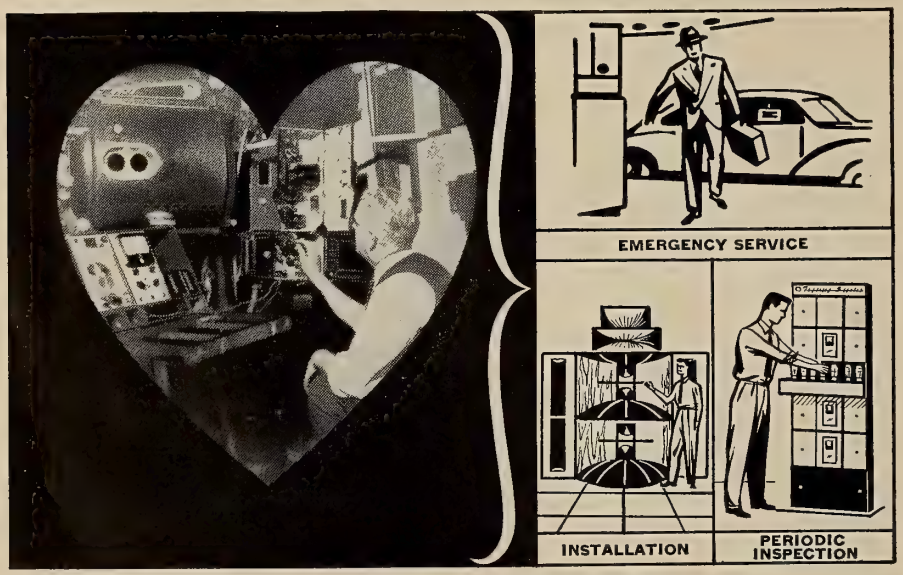
The characteristic features of a color sensation are:

(1) Hue: the property of color sensation causing us to give the color a name such as red, green and blue.

(2) Saturation: the extent to which a color sensation differs from "white" or to which the sensation is "colored"; the property that causes us to speak of faded colors or of vivid colors.

(3) The impression of brightness: the property that causes us to speak of light and dark colors.

The great influence of the surroundings upon colors can be further demonstrated in the following way (Fig. 1). A transparent window can be illuminated



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at the back with a number of differently colored lamps. Around the window is a field which may emit incandescent lamp-light or artificial daylight as desired, without affecting the light passing through the window.

"Persistence of Vision"

If the whole set-up is viewed from a few yards away and the light in the surrounding field is changed from daylight to incandescent lamplight, then in most cases after a while a decided change of color seems to take place in the small lighted window.

The fact that the change in color is not noticed until some time after the surrounding light is changed indicates that the eye requires some time to adapt itself to the changed surroundings.

A "law" has been formulated which for a number of years now has been widely adopted by psychologists and physiologists:

"The color sensations created by the colored objects in our surroundings are practically independent of the kind of light with which the whole scene is illuminated."

Goombye Curved Screens?

Proponents of the curved screen received a near-fatal blow with the opening of the installation by the Radio City Music Hall, N. Y. City, world's largest theatre, of a *Flat Matte* seamless screen. This move by the Hall is public confirmation in a smashing manner of every objection to curved screens ever voiced by IP.

This signal defeat for the adherents of curved screens, which IP regarded from the very first as a "joker," was all the more humiliating because it happened simultaneously with the opening at the Hall of the CinemaScope production "Rose Marie" (M-G-M).

The flat matte screen was also used for the subsequent highly important (to Paramount) demonstrations of VistaVision films before a highly critical audience.

As always, the passing of time inexorably demolishes the fakers and the technically ignorant.

New Advertising Projector

An automatic projection unit designed to be used in theatres for promotion of coming shows, concession products, etc., has been marketed by Genarco, Inc., of New York City. Called the "Sales Robot," the new unit provides a 5-inch by 6-inch rear-projection image for seven seconds and then automatically changes the slide.

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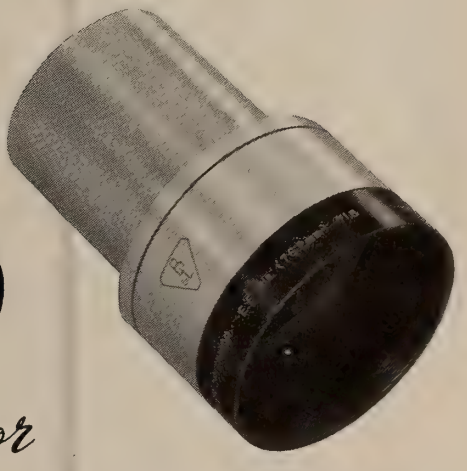
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RE-OPENING THE DRIVE-IN

(Continued from page 25)

plete 2- or 3-reel picture-and-sound rehearsal which will provide practice in opening and closing the show and in making changeovers.

20. Auxiliary Apparatus. A check of film rewinders, splicers, storage cabinets, stereopticons, spotlights, *etc.*, is in order. The non-synchronous phonograph is also to be examined for mechanical and electrical defects. Frequency response changes may be necessary when disk reproduction is unsatisfactory.

Projection preparations in drive-in theatres are comparatively simple. This type of theatre is a fairly recent innovation, hence the projection equipment installed in such operations is comparatively modern. Sound tests in drive-in theatres include a check of all plug-in boxes and in-car speakers.

Screen problems, too, are different from those in permanent theatres. Evidences of weathering on the screen surface call for a repainting of the entire screen.

The suggested procedure for lining up the equipment in the "permanent" type of theatre is applicable in a general way to drive-in and "temporary" theatres. The projectionist assigned to a summer theatre can make certain of conserving time and effort by taking this copy of IP along with him, or else jotting down in his notebook the numbered capital-letter headings of the 20 steps present herein.

BACKSTAGE AT CINERAMA

(Continued from page 16)

tape clipping along at that rate with very little of it overlapping.

I did not get to see the console unit until several nights later—and then in the company of Jim Day, veteran projectionist and console operator. An audiophile and amateur radio operator with a background in theatre operation and sound work, Jim is particularly well qualified for his job. While waiting for the second half of the show to start, I asked him a few questions about the console. "Come on," he said, "I'll show you."

"Turn up your spotlights, Earl," Jim said into the microphone after we had settled ourselves before the control panel. The great concave curtain suddenly was bathed in radiance.

"Houselights half way." As the electrician backstage dimmed the chandeliers, Jim began reciting a check list for the projectionists:

"One 'B,' Print Eleven. In frame. 'S' in the upper left hand corner. Counter on zero. Gate in top side up. Full trim, clamp down. Sound is in 'remote': Able, Baker, Charlie, switch to 'remote' when you are ready."

One after another, three orange lights appeared on the control panel, indicating that the projectionists had turned over control of their machines to the console.

"Open the curtain," said Jim; and the huge drapes rolled apart, revealing the magenta-lighted screen. "Motor count: one, two, three, *on*." He pushed several switches to the right and Lowell Thomas' voice began shouting "quiet" from various parts of the auditorium — the beginning of the stereophonic sound demonstration.

"All machines are now in sync," Jim announced.

"In sync with what?" I asked. "There's no picture."

"No, but all machines are running," he replied, indicating three flashing green lights on the board. "There are 461 feet of opaque leader before the Cypress Gardens sequence begins."

Starting the Picture

Just as the sound demonstration ended, Jim flipped three switches, opening the dousers on the projectors. Simultaneously, he told Earl to kill the screen lights. Suddenly we were in Florida, enveloped by the Cypress Gardens.

"How do you correct the sync from here?" I wanted to know.

"Here," motioned Jim, "I'll show you. The center projector is behind right now."

Sure enough, the center green light was failing to flash, though I could not detect anything amiss on the screen. Holding down a switch to



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override the automatic synchronizer, he began turning the center one of three knobs on the board. When he had turned it to the right two graduations, the center light began to blink again.

"Two frames out," he said. I went on asking questions.

"How do you get the projectionists to regulate their arcs in order to match the brilliance of the screen panels?"

"I don't. I control them from here —watch the right panel." As he held down a switch, a slight change in light intensity could be noticed on one of the panels. Reversing the switch brightened it again.

Jim explained as the canoeing sequence began to unfold, "each of the five channels runs through its own speaker behind the screen. But we have an additional effect that sounds even better." He plugged a patching cord into the console board.

The effect was as if the Everglades suddenly were all around us. What he had done was to put the bird calls which had been coming down from one of the stage speakers onto the auditorium speakers as well. Later on, during the America sequence, he arranged the choir so that the basses sang from the rear, the sopranos from one side, and the altos from the other. The effect was terrific.

The side and rear speakers are always manually controlled. Since the stage speakers account for five of the sound tracks, the operator must manually direct the sixth track wherever it belongs in the auditorium. The seventh, or composite track, is not used regularly. Playing the same track out of all the speakers at once results in sound wave interferences that cancel each other out in some parts of the auditorium, reinforce each other and distort the sound in others.

New Productions

I asked Ed Miller what plans there were for new Cinerama productions. "Louis de Rochemont (who made *Martin Luther* and *House on 92nd Street*) is working on one for us," he said. "He had a crew in New England that finished up there recently and then went to Europe; and another crew just got back from South America. It will obviously be some kind of travel picture, but I don't know any of the details."

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WHO KILLED COCK ROBIN?

(Continued from page 10)

the demands of precision and technology to the death.

How valiant was his resistance may be judged from a 3-D trade premiere in a three-quarter-million community where the projectionists were denied any rehearsal and the preparation and alignment of equipment was cut short with the exhibitorial comment that "it wasn't necessary". Consequently the picture opened with:

1. Projectors out of plumb and out of registry.
2. Projectors out of synchronism.
3. One projector 1½ turns out of focus.
4. Polaroid filter on the other projector reversed.

A film company representative viewing the premiere stated it was the best of 14 he had seen. The other 13 must have been beauts.

Another theatre in the same city ran a 3-D picture out of synchronism for its entire engagement. The manager refused to let it be corrected. Such was the calibre of the exhibs valiant resistance. Their heroism is fittingly memorialized in the mute fronts of their dark and silent theatres.

Here and there are faintly flickering promises that sufficient exhibitors have realized that this is IT, that the dictum now is precision and technology "or else" if the industry is to stay alive. It is less likely that the engineering and service companies one day will realize that one smooth performance in the laboratory and a *full day* of smooth *performances* in the theatre are two vastly different matters and that the latter absolutely requires advance delivery of film and tape, inspection, constant checking, adequate pre-show cleaning and adjustment and rehearsals

All these add up to "booth costs." If the exhibitor be unwilling to pay this nominal price for a full house, he should then emulate the farmer and the airlines, set up a good lobby in Washington and get a government subsidy. After all, you can't beat "free enterprise" — if someone else will pay for it.

ANATOMY OF C'SCOPE

(Continued from page 8)

lowed by 20th to employ such a screen for CinemaScope, the production of CinemaScope films by other companies and the waning novelty-value of the process will undoubtedly spur efforts toward pictorial improvement by means of a flat screen.

Flat Matte Screen advocated

But it is not only to obtain a flat surface for undistorted CinemaScope projection that the writer advocates matte screens. Aluminum screens have several serious faults which must be weighed against their two advantages —high brilliance and ability to preserve the polarization of light in 3-D projection.

Aluminum screens, even in standard projection, are likely to impart a grainy, blotchy appearance to the projected pictures. The graininess, usually visible from seats near the screen, is caused by the physical characteristics of aluminum pigments and by the texture of the screen fabric to which the metallic paint is applied. One of the approved CinemaScope

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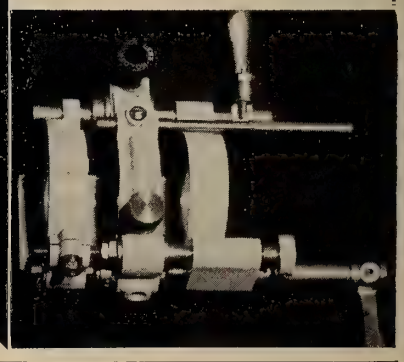
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screens, for example, is embossed in such a way that the pictures look as though they had been photographed on coarse-grained film. The blotchiness is due to wrinkles and "waves" in the screen.

Wrinkles in matte screens are invisible if not too severe, and they never produce irregularities in lighting. Aluminum screens, on the other hand, are so specular or mirror-like that the slightest departure from a smooth surface shows up as dark spots or streaks. Even the most careful stretching is no guarantee that the curved aluminum screen will have the smoothness necessary for uniform brightness when illuminated by the virtual point-source of the projector lens.

These two failings of aluminum screens result in a noticeable deterioration of pictorial quality. Fine detail of low contrast is partially obscured by the graininess of the CinemaScope screen, and the delicate nuances of photographic tone, so perfectly reproduced on matte screens, are coarsened and blurred on aluminum screens. The loss of definition is practically invisible from the back rows of seats; but the blotchiness of illumination is not masked by distance.

Deterioration of Image Character

In wide theatres the use of aluminum screens is inacceptable because of the extremely serious fadeaway of light at large viewing angles. While patrons in the middle of the auditorium see an excessively bright picture, observers seated at the sides of the auditorium see a dim picture. As seen from the side seats "down front," the picture is eye-strainingly dark. Differences in brightness at different viewing angles do not exist with matte screens.

Recall the aforementioned effect of perspective-foreshortening with curved screens. While the foreshortening experienced by an observer seated at the side of the auditorium is uniform in degree in the case of flat screens, the curved screen gives a greater amount of foreshortening on the side nearest the observer. But more annoying than the non-uniform foreshortening with curved screens is the serious fadeaway of light on the side of the aluminum screen farthest from an observer in a sideseat. Only close to the center-line of the auditorium does the picture-illumination appear reasonably uniform on the curved, aluminum-surfaced CinemaScope screen.

Seamless Screens a "Must"

The specular characteristics which make wrinkles in aluminum screens highly visible also makes seams disagreeably conspicuous. CinemaScope screens should be made in one piece, or else joined so that no seam is visible. The large number of conspicuous seams in the Miracle Mirror screen, for example, produce the effect of vertical wires suspended between the observer and the crazily-distorted world of CinemaScope. Yet Miracle Mirror is an *approved* screen! The miracle, we think, is that 20th-Fox would approve decorating "The Robe," its most grandly upholstered CinemaScoper, with barrier-like vertical seams that resemble the bars of a bird-cage.

The "depth-effect" of CinemaScope isn't even an illusion—it's totally nonexistent. The myth is kept alive by the pitchman's slogan, "You see it without glasses." The implications are fraudulent. One look at CinemaScope with or without glasses is sufficient to demonstrate the strictly 2-D quality of the process.

Image Composition Governs

The illusion of depth is greater in a conventional picture than in CinemaScope because the exaggerated wideness of the latter, together with the geometrical distortions resulting from screen curvature and projection angle, materially decrease the psycho-visual effectiveness of photographic perspective. As a substitute for real stereopsis, CinemaScope is a big disappointment. It has no more depth than an animated billboard.

Anent CinemaScope, our opinion is that landscapes from which *straight*

Movie Critique

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lines are absent—scenes of mountainous terrain, for example,—are thrillingly realistic on the wide screen. This is especially true when such scenes are shot from airplanes or vehicles to impart motion to the camera.

The illusion is, however, one of spaciousness and distance, not of true 3-D. Stereoscopy, or 3-D, involves *binocular* perception of depth, which obtains only in the case of nearby objects. Scenery more than 900 or 1000 feet distant is absolutely "flat" as perceived by human vision; and true stereoscopy appears only when foreground objects are present.

Conventional 3 x 4-proportioned 2-D movies are similarly capable of effectively reproducing the grandeur of natural scenery *when the screen is suitably* large (as it is in many theatres) and they have the advantage over CinemaScope of superior photography, undistorted pictorial representation, and a better suggestion of depth. True 3-D movies, *which must be viewed through analyzers*, are useful as a novelty and should be continued on that basis.

So, too, should CinemaScope, for that matter. But like CinemaScope, 3-D pictures fall far short of the standards of viewing comfort and naturalness which have characterized conventional pictures for many years.

Presently, CinemaScope employs a specially performed 35-mm film to which is applied three magnetic sound strips 0.063 inch wide and one which is only 0.029 inch wide. (The narrow strip, intended for incidental sound effects, is seldom used.) Of the three comparatively wide strips, one is adjacent to the picture-area and occupies the place of the somewhat wider normal photographic soundtrack of standard release prints. The other two are placed outside the perforations.

Magnetic-Track Structure, Cost

These strips, applied to the base-side of the film, contain finely divided iron oxide obtained by chemical precipitation and constitute magnetic soundtracks for stereophonic reproduction. This, together with several other factors to be discussed, makes CinemaScope prints much more expensive than standard release prints.

The CinemaScope projector-aperture (0.912 x 0.715 inch) is approximately 9.5% wider and 16.1% higher than the standard 35-mm aperture. The standard soundfilm aperture accordingly has an aspect-ratio of 1 to 1.375 (which is exactly reproduced on the screen by normal projection lenses at a zero-degree projection angle), while the CinemaScope aperture has an aspect-ratio of only 1 to 1.275. But because the anamorphic CinemaScope lens has an "extension-factor" of 2, the *projected* CinemaScope picture has an aspect-ratio of 1 (1.275 x 2) which equals 1 to 2.55. Fig. 3 illustrates the relative sizes of standard and CinemaScope projector apertures and screen images.

The slightly larger size of the CinemaScope aperture does not require an increase of arc current. This aperture merely utilizes more of the "spot" and passes about 1.3 times more light to the lens. The anamorphic lens, however, cuts screen illumination (foot-candles) in half because it doubles the area of the picture. If a white screen were used, twice the normal amount of light would be needed for CinemaScope; on an aluminum screen having twice the apparent brightness of a white screen (foot-lamberts), no increase in arc amperage is necessary.

Inherent Error Magnified

Very important in CinemaScope projection is the fact that the anamorphic lens having an extension-factor of two (2) doubles the amount of sidesway of the picture. The writer has observed that the sidewise weaving is especially disagreeable with projectors having studio guide-rails for edge-guiding the film through the gate. The rails seldom fit the width of the film exactly; and if adjusted to accommodate brand-new prints, they will be too far apart to prevent sidesway when shrunken film is run. *All film, even triacetate safety stock, shrinks with age and repeated use.*

Sidesway occurs in the older projectors having but one flanged guide-roller and no guide-rails, of course; but the absence of guide-rails makes weaving less conspicuous. When the film "brings up" against one guide-rail, it immediately "bounces" to the other rail and oscillates from side to side in an irregular manner. The rails *limit the range* of sidesway, but they *increase its frequency*, making it very objectionable indeed.

The sidesway problem has been *completely* licked in projectors employing *two* flanged guide-rollers, one at the top of the gate and the other just below the intermittent sprocket. Projectionists who do not have machines of this modern construction will find that a pair of older mechanisms having no guide-rails will give excellent CinemaScope results if the mechanisms can accommodate f:1.9 lenses and are fully reconditioned.

[TO BE CONCLUDED]

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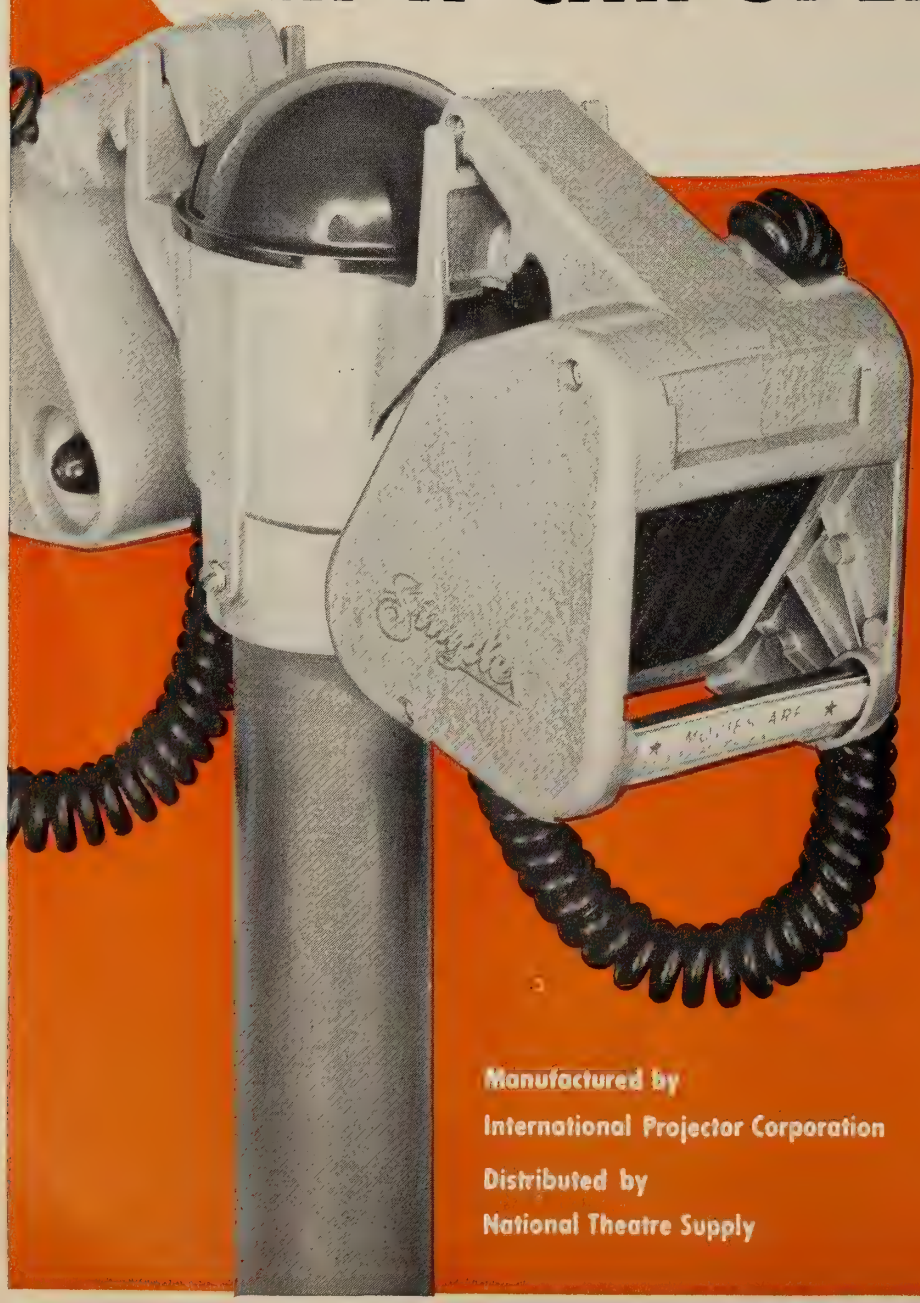
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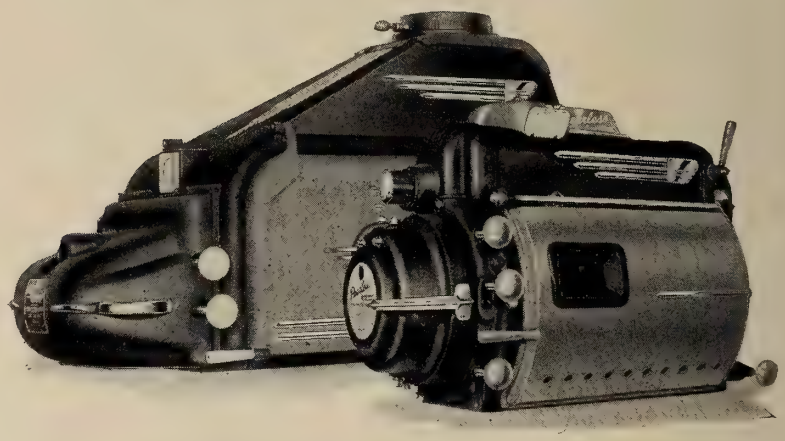
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With Which Is Combined PROJECTION ENGINEERING

JAMES J. FINN, *Editor*

JAMES MORRIS, *Associate Editor*

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MONTHLY CHAT

MUCH criticism from other than projectionists has been leveled at IP because of its consistent opposition to the system of magnetic sound reproduction. IP has and does now contend that from the moment a magnetic sound track is threaded in the projector, deterioration of sound quality is emphatically noticeable.

It is easy enough to toss opinion upon the wind; but the results of an impartial test just concluded by IP sustain our position in this respect. There is available conclusive evidence that no magnetic recording print will run more than 200 hours from birth to death without serious impairment of sound quality. Moreover, as IP pointed out recently, there are side effects of this magnetic film process—the depositing of the iron filings with which magnetic prints are treated all over the projector mechanism, with especial significance to the coating deposited on the back element of the projection lens.

Magnetic Reproducer Wear

Never mentioned by the proponents of magnetic sound reproduction is the problem arising when the reproducer head is wider than the sound track; less difficult but no less significant, is the situation wherein the sound track is wider than the reproducing head. In the first case, the groove is likely to be worn; in the second case, the head wears fairly evenly all over. But in either event, the necessity for replacement of the reproducing head (not to mention the short life of the print) is imperative if acceptable sound reproducing quality is to be maintained. We quote from the laboratory report to IP:

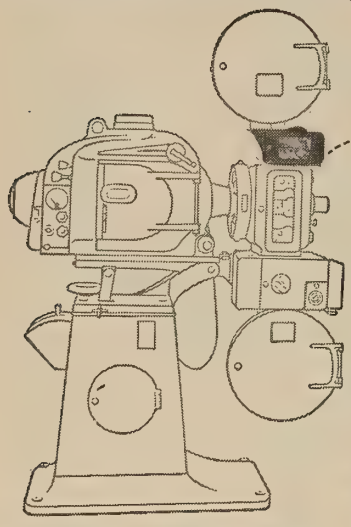
"Laboratory tests on a commercial type, four-track magnetic head which is widely used in CinemaScope installations indicate definitely that the head is good for approximately 1¼ million feet of running film, or about 240 hours. The life of magnetic sound reproducing heads depends, to a certain extent, upon the design of the film-pulling mechanism, on the tension in the film as it passes over the head, and on the film wrap around the head. The latter is, of course, a matter of manufacturer design.

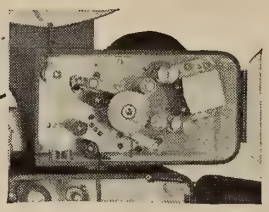
Proper Film Tension

"It should be pointed out here that the location of the CinemaScope tracks adjacent to the sprocket holes appears to call for a higher film tension than is the case where the tracks are removed

(Continued on page 34)

Westrex has a complete line of magnetic equipment for studios and theatres



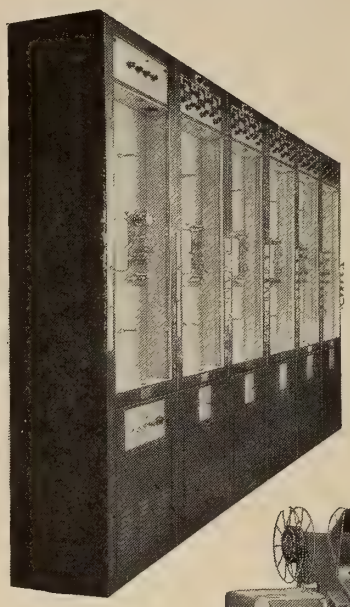


Westrex R9 Stereophonic Reproducer is a simple, high quality mechanism for reproducing quality stereophonic sound in theatres.

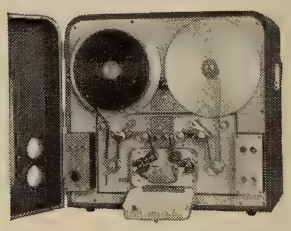
R9 Reproducer, installed between upper magazine and projector mechanism, operates with any modern projector or sound head.

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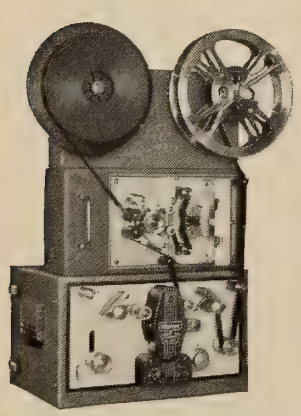
For recording, re-recording, editing, electrical printing, and reproducing stereophonic sound at its best, Westrex offers a complete line of multiple track magnetic equipment of advanced design. Representative models of magnetic equipment shown on this page are in addition to Westrex photographic equipment for studios and theatres.

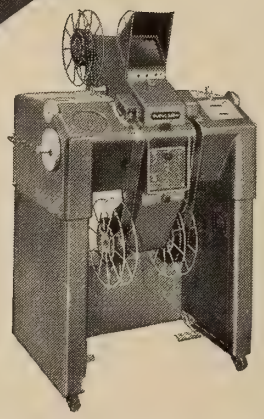


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FORMERLY WESTERN ELECTRIC EXPORT CORPORATION

INTERNATIONAL PROJECTIONIST

VOLUME XXIX JUNE 1954 NUMBER 6

One Down — Much More to Go

By JAMES J. FINN

THE LONE voice of IP pleading amid a welter of silence from all other organs of printed expression in this industry for a sane approach to technological standards swelled to a chorus of approval by a large segment of the exhibition field at the recent round-table forum called by Fox under extreme pressure and attended by more than 1000 exhibitors from every section of the U. S.

Net result: the surrender on a wide front by 20th Century-Fox of its self-assumed prerogative to dictate to the exhibition field the manner in which 20th-Fox productions could be shown. Finale: announcement by 20th-Fox that in future it will supply CinemaScope and regular release prints in four different versions, as follows:

1. Four-track magnetic stereophonic sound;
2. Single-track magnetic sound;
3. Single-track optical sound (the foregoing requiring the use of anamorphic lens attachment and that which 20th-Fox describes as the "proper" screen);

AND

4. Present-standard, 3 x 4-proportion prints with single-track optical sound.

Break Product Bottleneck

Simultaneously, Metro-Goldwyn-Mayer abandoned its requirement for stereophonic reproduction of its C'Scope releases.

This joint 20th Fox-Metro move insures that any theatre anywhere in the world may play *all* the product of the major producers without recourse to special and highly expensive equipment; while those theatres that already have the full complement of equipment will continue to be serviced with prints for multi-channel reproduction.

Single-Track Reproduction

This latter group was the source of some rather tart comment at the 20th-Fox exhibitor forum on the basis that their "adventurous" spirit in moving early to install multi-channel systems had been "washed out" by the 20th Fox-Metro decision, thus destroying their "competitive advantage" and permitting their more cautious brethern to "walk out of the forum with the bacon".

20th Fox met this sally by insisting that the moviegoing public has now been "educated" to "true stereophonic" sound reproduction and would bestow its patronage on those houses equipped for this medium.

Apropos the single-track magnetic sound prints, a theatre which has not yet installed *any* new equipment may avail itself of such prints by the addition of a pickup head and a preamplifier for reproduction through a single speaker. Of course, without the addition of a modern speaker, such a theatre might just as well settle for the single-track optical sound print.

As between the single-track magnetic and the single-track optical sound there exists a wide variance of opinion even among ranking technicians as to their respective merits. The expense factor would seem to be controlling.

Of the four release prints previously listed, it is understood of course that the first three named are CinemaScope prints and require an anamorphic lens for their exhibition. As to the "proper screen" suggested by 20th-Fox, there is a growing tendency within exhibition circles to disregard this recommendation and to revert to a *flat* matte screen. Curved screens are steadily falling into disrepute in the exhibition field.

Small Exhibitors Relieved

The availability of 20th-Fox productions in standard 3 x 4 proportions is the best news received in many months by thousands of small theatres which cannot afford any sizeable money outlay and which have heretofore been shut off from Fox product.

There is not the slightest inclination on the part of IP to ballyhoo its single-

handed press battle against the inflexible demand by 20th-Fox that its product be given the full stereophonic sound treatment in theatres. IP reported and discussed the facts in this situation as it saw them—and the two major premises of its opposition to the 20th-Fox demands were the cost factor and a deep-seated conviction as to the advantage conferred upon any picture by stereophonic reproduction, especially in the smaller theatres wherein screen width was restricted by the physical characteristics of the structure.

Many good friends of IP—including both professional engineers and projectionists—have indicated their preference for stereophonic sound reproduction in any size theatre, their stand being based on the "naturalness" of the sound reproduction, irrespective of auditorium size or structural characteristics. This may be; but on the basis of a comparative test between multiple-track and single-track optical reproduction, the latter employing an "integrator" which shunts the sound to the various speakers, IP was unable to detect any pronounced difference in quality.

Magnetic Pickup Head Wear

Moreover, wear on the magnetic pickup head is continuous, resulting in rapid deterioration of the pickup surface and a steady decline in sound quality during the process. Then there is the matter of the filings which peel off the magnetic film striping and are deposited all over the projector head, especially on the back element of the lens, necessitating constant cleaning. A worn magnetic pickup head, like an old shoe, may only be thrown away.

Several top-flight engineering organizations are now engaged in a frantic search for the answer to this "peeling" problem. IP has no doubt that in time these fellows will come up with the answer; but this report is concerned with the ever-present, not the indeterminate future.

Relative to screens, IP realizes that a metallized surface was necessary for showing 3-D releases, but it has consistently and vigorously opposed the use of such a screen for other than 3-D releases. The 3-D horizon at the moment is gray indeed, if not black, and the thousands of theatres who invested in such screens now have ample reason for regretting their precipitate haste in this direction. Such regret neither recoups their financial loss nor removes the screen from their theatres.

"Curved" Screens Disapproved

As for "curved" screens of whatever character, IP has always regarded them as the veriest nonsense, for reasons which have been detailed repeatedly herein. Curved screens are not only a perversion of the basic principles of good projection but they also occasion an economic loss by rendering useless a not inconsiderable number of side seats.

IP has always held that these "special" screens were phony, and widespread realization of this fact is now apparent not only among projectionists but among those manufacturers who have the continuing welfare of the industry at heart as opposed to the policy of putting over anything and everything for the sake of turning a "fast buck".

In the forefront of those offering vigorous opposition to these "special" screens, the use of which was demanded "or else" by CinemaScope proponents, are the manufacturers of arclamps who are incensed at propoganda that the use of a "special" screen obviates the need for the powerful arclamps now available.

For many months the lamp manufacturers have fought this battle behind the scenes, but the matter has now exploded into open war by forthright declarations by the manufacturers in the editorial and advertising columns of the trade press, which, with the sole exception of IP, has been ignorant of or chose to "play safe" on this vitally important topic.

A notable example of aroused manufacturer ire is on view in this issue of IP, wherein in some of the most forthright and refreshing language ever employed in technical advertising copy a lamp manufacturer brands as "fallacies" the theories advanced by the proponents of "special" screens and commiserates with those exhibitors who "fell" for such theories and thus "found themselves betrayed."

Flat Matte Screen Endorsed

The manufacturer cites how his lamp, burning at 135 amperes, produces 16,000 lumens to the screen through CinemaScope aperture and an anamorphic lens *with the shutter running* and achieves 15 foot-lamberts at the center of a matte white screen 50 feet wide by 19½ feet high! Comparison of these figures with the SMPTE standard of 9 to 14 foot-lamberts is made.

Now, there is no doubt whatever that a flat matte white screen affords maximum light distribution throughout the theatre, as is conclusively demonstrated at the Radio City Music Hall in New York, world's largest theatre, which recently installed a flat matte white screen for *all* film presentations. But it is equally true that a matte screen requires more light to be projected thereon in order to equal the output of other types of screens. So what? There is no lack of powerful projection light sources of various amperage ranges, the price of which is small indeed when compared with the huge expenditures already made for excess equipment.

Curious it is that when the proponents of CinemaScope were throwing their weight around and dictating what an exhibitor might or might not do, they were strangely silent anent the advantages of a new and more powerful projection light source.

Still a most pressing projection problem is the matter of aspect ratios, with not a word emanating from 20th-Fox to indicate that it has any intention of receding from its firm stand in favor of the 2.55-to-1 proportion. IP has always been and will always be opposed to this aspect ratio, for reasons set forth on numerous occasions in these pages. The 2-to-1 ratio is the extreme limit we would favor, while preferring the 1.85-to-1 proportion.

(Continued on page 33)

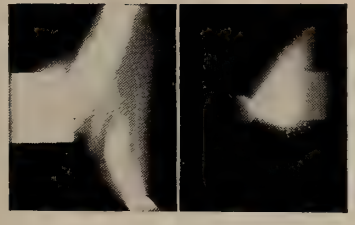
Exhibs Want Stereo Money Back

A new twist to the slightly muddled technological exhibition picture was provided recently when the North Central Allied exhibitor group, through its executive counsel S. D. Kane, reported a "sizeable number" of its exhibitor members who installed stereophonic sound now want 20th-Fox to reimburse them for the equipment "which has become unnecessary". Kane, who is looking into the legal aspects of the situation, stated:

"The representation was made that exhibitors only could obtain 'The Robe' and other CinemaScope pictures by installing stereophonic sound." This, it now develops, was a misrepresentation. "The exhibitors proceeded and made substantial investments on such a misrepresentation. We now want to determine if Fox is legally liable for the unnecessary expenditures."



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THE PICTURE IS LIGHT — This is a fact exhibitors should know and remember. Every tone of light and shadow, every hue and shade of color on the screen are contained in the light *behind* the film. The film itself cannot *add to* the picture. It creates the screen-image only by filtering or *holding back* certain elements of the projection light.

LOW-COST IMPROVEMENT — Your "National" carbons deliver maximum screen-light at, or near, maximum recommended operating currents. *Only by operating at peak current can you get all the screen light your present equipment is capable of delivering.* So, while you're figuring new lamps or awaiting delivery, don't miss this inexpensive means of improving your position in a highly competitive market. *Light* is box office, too!

The Anatomy of CinemaScope

By ROBERT A. MITCHELL

The concluding article of two which discuss the width, size and over-all pictorial composition of the wide-screen image.

USERS of mechanisms having rear- and front-shutter combinations will find that the front-shutter component must be removed to make room for the anamorphic-lens attachment. We have found that no change in picture-quality occurs when the front shutter is discarded, confirming our frequently expressed opinion that the rear- and- front combination was devised merely as a selling-point.

Anamorphic History

The anamorphic lens on which CinemaScope depends has an extensive history. "Squeezing up" the pictures on the film and then expanding them on the screen is an old trick of the optician's art. Professor Ernst Abbe, one of the founders of the German optical firm of Carl Zeiss, and Dr. P. Rudolph, director of the photographic division of the Zeiss works, devoted attention to anamorphic optics even before the turn of the century. An anamorphic lens computed by Dr. Rudolph was produced in 1897. This was probably the first lens of this type ever made.

More than two decades ago, Professor Henri Chretien of Paris, basing his work on that of Rudolph, designed and produced anamorphic objectives in an effort to obtain wider fields in motion picture projection. It was not until 1952, however, that the motion picture industry became sufficiently interested in the system to invest heavily therein. To 20th Century-Fox go the laurels for pioneering the anamorphic wide-screen process commercially.

The principles involved in anamorphic optics were ably described by Chretien and IP's editorial staff in IP for June 1953 (page 14).

Anamorphotic projection lenses may be either *complete* lenses or merely "hypergonar" attachments which slip on over the barrels of the regular lenses. CinemaScope utilizes hypergonars designed by Professor Chretien and first manufactured in quantity by Bausch & Lomb. Distribution of these attachments, like that of magnetic "penthouse" stereosound reproducers, amplifiers, speakers, screens, and other CinemaScope accessories, was at the outset rigidly controlled by 20th-Fox.

Lens Performance

The performance of CinemaScope hypergonars is usually fair, but by no means perfect. The projection hypergonars have been quite uniform in quality, but their performance has often been marred by residual aberrations which result in a blurring of the picture in substantial areas at each side of the screen. Close inspection of CinemaScope images reveals that these aberrations are largely chromatic, for purple and yellow-green fringes border the vertical edges of objects.

Minor divergencies from the standard extension-factor of two have been noticed in camera hypergonars, resulting in very slight abnormalities in the width of objects reproduced on the screen. The quality of camera hypergonars seems to be somewhat better than that of the projection attachments.

It is true that doubling the horizontal dimension of the screen-image magnifies the grain of the film-emulsion; but it has been pretty well established that this effect is a minor one in the overall problem of CinemaScope image-definition. The greatest care has been taken in all CinemaScope features and short subjects to have the images as sharp as the resolving power of the film emulsion allows. Technicolor dye-imbibition prints, having comparatively low definition, have not been used until recently.

High Print Cost

The so-called "Technicolor" CinemaScope prints released to date have actually been Eastman Color positives of the photographic, or multilayer dye-coupler type, processed in Technicolor's increasingly versatile laboratories. This is a matter of great concern to the producers of CinemaScope pictures because, even though the resolving power of photographic color film such as Eastman Color, Ansco Color, Agfacolor, Pathecolor, Gevacolor, etc., is practically as good as that of black-and-white film, the prints cost about 1½ cents more per foot than imbibition prints and create processing bottlenecks. So serious has the situation become—a situation aggravated by the short life of CinemaScope prints—that 20th Century-Fox is turning to Technicolor imbibition prints, presumably for foreign release.

Even though the use of imbibition printing will reduce the cost of CinemaScope color processing from about 6½ cents when Eastman Color is used to slightly less than 5 cents per foot, magnetic stereosound makes CinemaScope footage unavoidably expensive. Magnetic striping of the film is reported to cost about 4 cents per foot, and the recording of sound in each print plus incidental expenses comes to about 1½ cents. It all adds up to 12 cents per foot for the completed release prints on Eastman Color positive.

The high mortality rate of CinemaScope prints is due primarily to two factors, deterioration of the magnetic

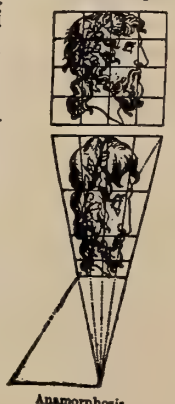
So They Say . . .

an-ă-mor′phism, *n.* 1. A distorted image of any object.
2. In biology, a gradual change from one type to another, generally from lower to higher.

an-ă-mor′phō-scōpe, *n.* [Gr. *anamorphōsis*; *ana*, again; *morphe*, form, and *skopos*, a watcher, from *skopein*, to see.] A vertical cylindrical mirror, which destroys anamorphosis and gives a correct representation of the object mirrored.

an-ă-mor′phō-sis (*or* -mor-phō′-) *n.* [Gr. *anamorphōsis*, a forming anew, from *ana*, again, and *morphoun*, to form.]
1. In perspective, a deformed or distorted portrait or figure which, in one point of view, is confused or unintelligible, and in another is an exact and regular representation; or which is confused to the naked eye, but, reflected from a plain or curved mirror, appears regular and in right proportion.
2. In biology, a gradual change of form to a higher type.

an-ă-mor′phō-sy, *n.* Same as *Anamorphosis.*



Anamorphosis.

DON'T BE SOLD A BILL OF GOODS!

The proponents of CinemaScope insist that the light distribution at all viewing angles to the screen, and across the screen, be uniform throughout the theatre. That the only way to accomplish this result is with a "special" high reflective screen is not true.

YOU DO NOT NEED TO BUY ONE OF THE NEW "SPECIAL" SCREENS FOR CINEMASCOPE IF YOU HAVE *Strong* SUPER "135" PROJECTION ARC LAMPS AND YOUR INDOOR SCREEN IS UNDER 50 FEET WIDE!

Experience has proved that uniform light distribution can be accomplished by the use of a matte white screen in conjunction with a good "Strong" lamp. You will have the ultimate in picture brilliance with no perceptible fall-off in efficiency at the sides. It is a fact universally accepted by leading motion picture engineers that no screen equals a matte white screen for affording maximum light distribution throughout the theatre.

HERE'S PROOF!

A Super "135" Lamp, burning at 135 amperes, projects 16,000 lumens to the screen through a CinemaScope aperture and an anamorphic lens with the shutter running, and produces 15 foot lamberts at the center of a matte white screen 50 feet wide by 19½ feet high. *The Society of Motion Picture and Television Engineers' Standard is 9 to 14 foot lamberts* for 35-mm indoor projection. Accordingly, if you have Super "135" lamps, you can use an inexpensive matte screen and get excellent results.

GET THIS STRAIGHT!

Strong does not manufacture screens of any type but does manufacture lamps for efficient use with all types of screens. As a service to the industry we feel that we should explode the fallacies set forth in advertising matter by certain screen manufacturers that with their "special" screens the powerful modern-type projection arc lamps which are made by several dependable lamp manufacturers become unnecessary. The theatre owners who, unfortunately for themselves, fell for this story, have found themselves betrayed.

THE FACTS ARE THAT THE MOST PERFECT CINEMASCOPE PROJECTION IS BEING ACCOMPLISHED WITH THESE MODERN *Strong* LAMPS!

WE'LL BE GLAD TO GIVE YOU A LIST OF THEATRES, IF YOU WANT IT.

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"The World's Largest Manufacturer of Projection Arc Lamps"

31 City Park Avenue **Toledo 2, Ohio**

Which little girl will make it?

All else being equal, she'll be the one on the film which was more carefully selected and processed.

Unless film and handling are technically compatible, skin tones fade and features become wan and haggard—dull and lack-luster. Important this beauty care in the days of black and white . . . vital now *with color.*

To co-operate with the industry in helping solve questions of film selection, processing, and projection, Kodak maintains the Eastman Technical Service for Motion Picture Film. Branches at strategic centers. Inquiries invited.



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Hollywood 38, California

sound and the smaller sprocket-holes. The use of narrower sprocket teeth on projectors fitted for CinemaScope also decreases the life of standard prints by tearing, notching, and "checking" the perforations.

Wear on Perforations

The pulling of the film through "penthouse" soundheads by 16-tooth upper feed sprockets doesn't do the perforations any good. Sprockets of the 24-tooth size are better, and 32-tooth sprockets are better still.

Magnetic sound *recording* is now standard procedure in movie-making. To prepare standard release prints the completed magnetic track is re-recorded optically to obtain the regular photographic-track negative used for release-printing. Magnetic sound, when the tracks are sufficiently wide and the records handled with greater care than can possibly be accorded CinemaScope prints, has the advantages of immediate playback, low noise-level, and high fidelity.

The playing of CinemaScope magnetic tracks in theatres, however, is beset with difficulties almost impossible to eradicate.

Magnetic soundtracks are susceptible to partial erasure and the pickup of ground noise. Projector parts, especially sprockets, idlers, and the magnetic reproducing head itself, must be frequently demagnetized to minimize these troubles. (See "Hints on Handling Magnetic Soundheads," IP for November 1953, page 7.)

Stray Magnetic Fields

Many projectionists magnetize screwdrivers to permit easier insertion and removal of machine screws. Such screwdrivers, as well as other tools which have been accidentally magnetized by a severe blow, powerful vibration, or exposure to magnetic fields, impart undesirable magnetism to projector components. Magnetized parts of the reproducer introduce rumbling noises; while magnetized sprockets and idlers often mar the sound with clicks, thumps, buzzes, whistles, hisses, and even noises which resemble the whirring of the intermittent.

These noises, frequently accompanied by the fadeaway of sound, make themselves heard simply because they have become indelibly recorded on the film, especially in the two outside tracks.

Loss of sound and extraneous noises in magnetic tracks are irreparable. It might seem that the tracks could be completely erased and recorded over again; but the inevitable splices in used prints preclude this possibility. 20th Century-Fox has had no alternative but to scrap its garbled prints.

Twentieth-Fox may be sure that *no one* makes splices in CinemaScope film for the hell of it. With the magnetic tracks on the reverse side of the film, it's difficult stuff to splice.

Magnetic-Track Faults

CinemaScope sound also suffers from the narrow width of its tracks (0.063 inch) and rapid wear of the pickup heads. While distortion is of a low order when the pickups are in good shape, wear results in non-linear distortion and serious attenuation of high frequencies, making speech indistinct.

In practice, therefore, it is quite evident that CinemaScope's method of magnetic sound reproduction has vast potentialities of falling far below the high quality of normal photographic sound. The exciting lamp and photoelectric-cell are far from becoming *passe!*

The stereophony of CinemaScope not only leaves much to be desired, but, in the long, narrow type of auditorium, it may actually be unnecessary. The stereophony is admittedly effective when single-source sounds (such as speech) are involved; but loss of volume in one or two of the three tracks has the unpleasant effect of shifting the apparent source of the sound to one side of the screen. As a result, we often hear an actor's dialog booming from the wings like a disembodied voice.

Single-Channel Adapter

A few exhibitors are employing single-channel CinemaScope reproduction. This is done by combining the output of the three tracks in a simple mixer and using the regular theatre amplifier to amplify the combined signals. The mixers used for this purpose are definitely not approved by 20th-Fox execs, who maintain that their sound is ruined and that signals from the three tracks may actually cancel out in the mixer push-pull-wise.

Be that as it may, this writer feels that the expense and sometimes low quality of CinemaScope's stereosound invites exhibitor snubs with every misdirected chirp. It is noteworthy that Warners is issuing its CinemaScoper "The Command" in both single-track optical and multiple-track magnetographic editions.

With the single photographic track, projector apertures having the dimensions 0.825 x 0.715 will be needed. Curiously, this is the same as the old silent-film aperture masked off to cover the soundtrack (standard perforations assumed.)

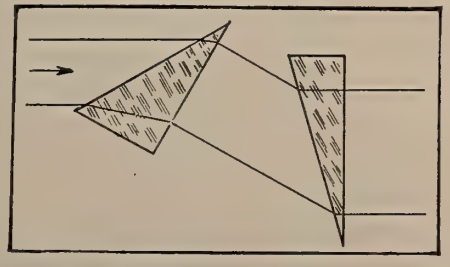
CinemaScope, like 3-D, has been a

(Continued on page 34)

Variable Anamorphic Lens Principle Explained

Projectionists who have been wondering about the operating principle of the variable anamorphic lens attachments recently marketed can satisfy their curiousity by observing the accompanying diagram from *Ideal Kinema*, London, which shows the simple prism arrangement used in a variable anamorphic attachment.

The prisms are arranged so that the parallel light from the regular projections lens strikes the first prism at an angle, and is refracted in the manner shown in the diagram. The beam then becomes wider and strikes the second prism, also at an angle. It is again refracted and expanded. The beam that emerges from the variable anamorphic attachment is parallel to the entering beam but wider, as the diagram shows.



Light beam shown passing through prisms of variable anamorphic lens.

When looking at the diagram remember that you are looking down at the prism arrangement from above. The refracting action of the prisms expands the beam horizontally, or from side-to-side, not vertically or up-and-down. In principle, it is similar to the refracting action in variable anamorphic devices such as the Tushinsky lens attachment proposed for use with VistaVision "squeeze" prints and the Gottschalk Super Panatar attachment.

Tips on Screen Illumination

This article examines the need for increased screen illumination when projecting pictures on large, wide screens. It also warns that shutter blades cannot be trimmed to gain light without reducing picture quality.

WITH the trend toward wide-screen projection still gaining impetus and many small and medium-sized theatres converting their equipment, it is a good time to re-examine some of the fundamentals of *photometry,* the science of measuring light, as they are applied to the motion picture screen. A knowledge of these fundamentals will help the projectionist to understand what can be done and what *cannot* be done to obtain the light necessary for illuminating larger screens.

However, let's not bother with formulas. Readers who want the whole story in an article that is easy to understand are referred to "Photometric Units in Projection" in the September, 1948, issue of IP. Rather, let's take a brief glance at the three light units that are most important to us as projectionists.

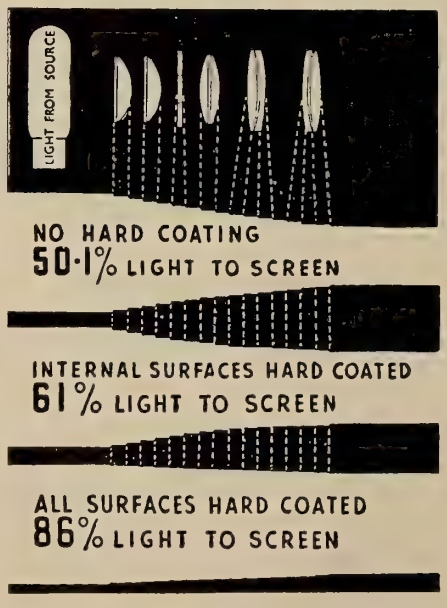
THE LUMEN: The *strength* of a beam of light is measured in lumens. Another way of putting it is that lumens indicate the density of luminous flux, or flow of light. Suppose 10,000 lumens pour from your projection lens when the projector is run without film. The beam is small, and hot enough to burn your hand. But the "spread-out" beam that hits the screen also has 10,000 lumens of light. It is less dense, but much larger in cross-section, and no light has been lost.

Projection 'Throw' Unimportant

This is why the length of projection throw does not enter into screen-illumination problems. All we need to know is how much light leaves the lens and how big the screen is. The screen can be 50 feet away or 200 — it doesn't make a bit of difference in the brightness of the picture if screen size remains the same.

FOOT-CANDLES: The beam of light leaving the projection lens is small and hot. The light is exceedingly intense. At the screen, illuminated by the spread-out beam, the light is much less intense. Now, the intensity of light is measured in foot-candles.

FOOT-LAMBERT: Suppose your screen is old and soiled, and you replace it with a fresh white screen, or have your old screen refinished. The new screen surface gives a brighter picture than the old one, doesn't it? And yet the number of foot-candles impinging upon the screen has not been changed. The brightness of a screen — or any extended surface — is measured in foot-lamberts. If the screen be a perfect diffuser, reflecting *all* of the light falling upon it (no actual screen is quite that good!) the number of foot-candles and the number of foot-lamberts will be identical. But actual screens absorb (or transmit through the sound perforations) about 20 percent of the light, which is wasted because it never reaches the eyes of the audience. So if we want 15 foot-lamberts of brightness, we must figure on a projection-light intensity of 18.75 foot-candles *at the screen* to compensate for the 20 percent loss of light.



The coating on the lenses that you use enables you to employ your optical units with the highest degree of efficiency, in terms of screen lumens. Light losses that occur as a result of reflection at all glass-to-air surfaces inside a lens are graphically presented here. Also shown is the degree to which such losses can be offset with coated lenses.

Candlepower

A fourth useful term is the expressive world "candlepower." If the positive crater of an arc is specified as having a candlepower of 50,000, then we know that it is as bright as 50,000 standard candles packed into a single small area. The higher powered arcs in use today have candlepowers even greater than this!

Here is an interesting point. The *smallest* brightness-difference perceptible by direct side-by-side comparison of two screens lies somewhere between 4 and 5 percent. If one projector in a theatre is brighter or dimmer than the other by an amount not exceeding 5 percent, not even a trained observer would be able to notice the difference at changeovers!

Even the most discriminating patrons are unable to detect on Monday a dimmer or brighter screen than they saw on Sunday unless the brightness be decreased or increased by at least 15 or 20 percent. In fact, patrons are not likely to comment on a brighter picture unless the brightness is practically doubled. To get a "rise" out of them, you must increase your present 10-foot-lambert brightness to 20 foot-lamberts, or your present 25-foot-lambert brightness to 50 foot-lamberts. The gain or loss of 5 or 10 foot-lamberts is hardly noticeable when normal screen-brightness exceeds 40 foot-lamberts. At lower light-levels such a gain or loss would be terrific, naturally.

Matching Arcs for 3-D

As for the matching of projectors for equal light-outputs, we must be mighty fussy when 3-D films are shown. The difference ought to be less than 5 percent, and we can't always hold the difference down as close as we might wish. If the difference in the brightness of the right-eye and left-eye images is considerable, it causes an uncomfortable sensation in the eyes and possibly induces eyestrain.

Suppose your light-output suddenly drops while projecting blank light

to the screen. In such a case we might say that the "tone," or color, of the illumination has changed from white to gray. Now, here is the question: How much does the light have to decrease to change the tone from white to medium gray? About 50 percent? Surprising as it seems, the light-output must drop 84.1 percent in order to produce a tone which, relatively speaking, is medium gray. In other words, if we arbitrarily state that a "white" surface has a brightness of 100 percent, a "medium gray" surface has a brightness of only 15.9 percent. The following list gives the relative brightnesses of an evenly graded series of grays.

White	100.0%
Faint gray	63.1
Pale gray	39.8
Light gray	25.1
Medium gray	15.9
Dusky gray	10.0
Deep gray	6.3
Dark gray	4.0
Dusky black	2.5
Night black	1.6
Absolute black	.0

Shutter Blades

This writer is completely in favor of optical efficiency in projection and wishes to see more light in more theatres. And yet he knows, both by experience and common sense, that projectionists who shave their shutter blades a trifle beyond a safe minimum width in order to gain 2 or 3 or even 4 percent more light are doing worse than merely wasting their time. Why? Picture-quality is imperiled by trimming shutter blades, *and the gain in illumination is too small to be visible even by direct comparison on two screens.* This is not mere theory or opinion. We have made exhaustive tests with a double-field illuminometer, and with all colors of light, including white of different color-temperatures.

If the brightness-difference is too slight to be seen even by the most perceptive observers, that brightness-difference does not exist for all practical projection purposes. In a word, if it can't be seen, it isn't there.

Not only are shutter-shearing projectionists gaining no visible screen-brightness, they are also running the risk of introducing 24-cycle flicker caused by slight differences in the widths of the master and balancing blades, they are making their shutters unfit for use if backlash in the gear-train develops for one reason or another, resulting in both top and bottom ghost-flashing, and they are hazarding the introduction of short travel-ghost haze, or at any rate a trembling of the edges of extremely bright objects in the picture, visible to patrons in front seats if the picture illumination comes up to or exceeds accepted standards.

Travel-ghost Tests

Every projectionist should have a travel-ghost test film. Certain black leaders having the frame-lines indicated by a row of small holes punched out of the film make good test films, and so do plain black-and-white titles with sharply focused lettering. Projectionists who can get a few reels of old silent films in good condition can make up a sizeable roll consisting of nothing but dialogue subtitles.

Traces of ghost, flare, and flickering haze due to imperfect shutter action cannot usually be seen from the projection room through the observation ports. It is always best for the projectionist to examine the test-film image from the stage while an assistant runs the projector. Where this cannot be done, the projectionist should remove the glass from the observation port, turn out the lights in the projection room, and examine the image with binoculars of good quality. The auditorium should be absolutely dark while a test of this nature is being made.

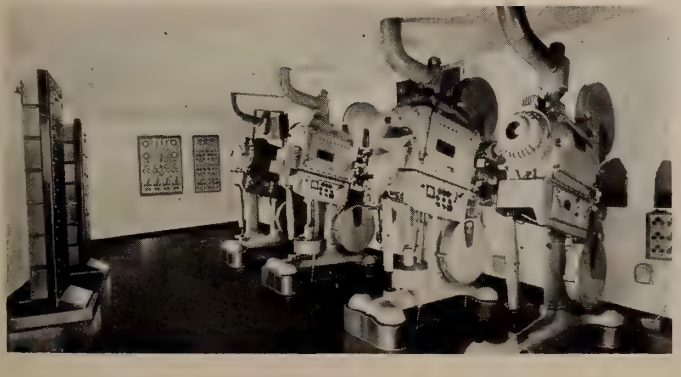
Shutter blades just a trifle too narrow reveal themselves in a rapid trembling of the top and bottom edges of the white letters in titles. The effect is easily seen from the front row of seats; it cannot be seen from the projection room unless the projectionist takes special precautions to insure perfect viewing conditions. We never see the picture as clearly as our audiences do.

The trembling is due to the fact that the film is exposed while the intermittent is just coming to a stop and also just beginning to pull down the next frame. It sometimes helps during this test to reduce persistence of vision temporarily by looking at a bright light before running the test film. When the shutter blades are sufficiently wide, a well-photographed title will be practically indistinguishable from a motionless slide.

Trimming Blades Hazardous

Now, if the shutter blades are a trifle wider than is necessary, so that 2 or 3 or even 4 percent of the light is unnecessarily wasted by them, the loss need not worry the projectionist — it is too small to be appreciable, and the positive gain in picture-steadiness and freedom from flicker, trembling, and travel-ghost flare is too great to sacrifice by shutter-shearing.

Slightly soiled lenses cause a light-loss of from 5 to 10 percent. Add to this similar unnecessary losses from dusty projection-port glasses and badly pitted lamp mirrors, and it can be appreciated that the light-conscious projectionist — a term that happily includes most of us — will concentrate his attention on optical cleanliness and will waste no worry on *imperceptible* losses caused by wide shutter blades which, because of those *imperceptible* light-losses, are contributing very efficiently to perfect clarity of the screen image.



One of the better foreign projection rooms — the Reposi Theatre in Turin, Italy. Projectors are Microtechnica, an Italian make.

Canadians Building 59 Theatres

Recent reports from Canada indicate that 59 theatres are under construction north of the border, 20 auditorium houses and 39 drive-ins. In addition, 17 theatres opened since the beginning of the year, three of them drive-ins.

RCA's Portable 16-mm Arc Projector †

By J. J. HOEHN, A. J. CARDILE and RALPH A. WOOD

Because of the increasing need for professional-quality projection by industry and by educational, social and religious groups, this article should be of interest to projectionists. They have the experience needed for professional results with the equipment described.

THE RCA Porto-Arc 16-mm projector is designed to provide sufficient light and audio-power output to handle larger screen sizes and audiences than can be accommodated with projectors using conventional incandescent-lamp light sources. The design was made possible by the development of a dual operating-range 16-mm arc lamp and associated rectifiers small and light enough to justify the use of the term "portable."

This lamp has been integrated into an overall projector design which allows the equipment to be separated into readily portable units. For example, the arc lamp is easily disconnected from the projector mechanism, and both units merely lift off the pedestal-amplifier assembly to make sections which can be conveniently handled and transported.

Mechanical Design

Figure 1 shows the Porto-Arc Projector disassembled for transportation. First on the left is the pedestal-amplifier assembly, which is about the size of a large suitcase of conventional proportions.

The second item from the left in Fig. 1 is the portable loudspeaker regularly used with RCA Model 400 16-mm Projectors. The third item is the dual-range arc lamp, and next is its associated rectifier for converting A.C. line power to the low-voltage D.C. required for proper operation of the arc lamp. The fifth and last item is the projector mechanism; reel arms and small accessory items are mounted within its housing. The heaviest items are the pedestal-amplifier and the rectifier, which weigh about 60 pounds each due to the inevitable weight associated with transformers of adequate performance characteristics.

In Operating Position

Figure 2 shows the Porto-Arc Projector set up and operating. The projector mechanism and the arc lamp lock firmly together in correct optical alignment by means of guide pins, locating holes, and an aircraft-type cowl fastener.

The assembled mechanism and lamp rest on the upper surface of the pedestal-amplifier case as shown, supported by the rear arc-lamp feet and by the movable front pins of the tilting device incorporated in the case. The pedestal legs are splayed a considerable degree laterally and longitudinally to provide excellent mechanical stability for the complete projector.

Amplifier System

The pedestal-amplifier assembly has separate compartments to contain its demountable legs and the interconnecting cables, and it also incorporates the 5-degree tilting mechanism in the front operated by a fold-in crank. Adjustable legs accommodate the projector optical axis to existing projection room portholes and "up" or "down" projection angles. All interconnecting cables are provided with suitable plug connectors of a variety of types to prevent incorrect connections. In other words, if the plug on a cable end fits a given socket, it is the *right* plug for that socket.

† Jour. of SMPTE, March, 1954.

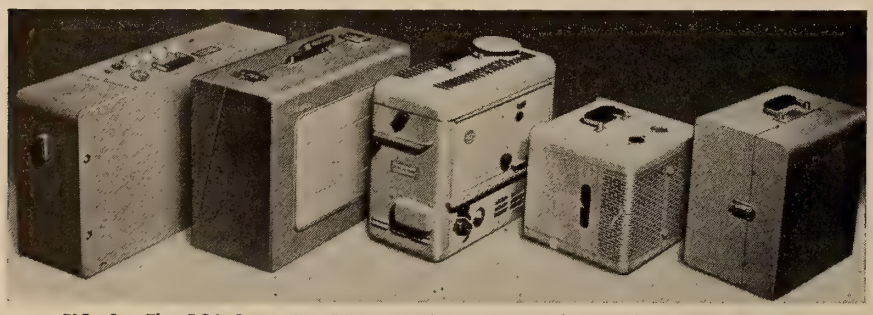


FIG. 1. The RCA Porto-Arc 16-mm projector is complete in five carrying cases.

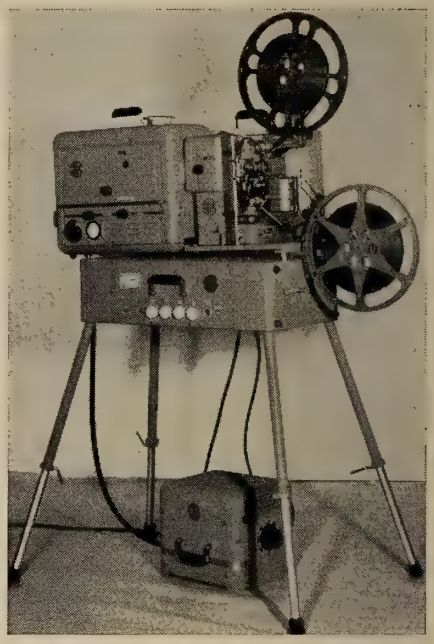


FIG. 2. RCA Porto-Arc in operating position.

Figure 3 is an interior view of the pedestal-amplifier case with the control panel removed to show the amplifier chassis. The amplifier incorporates the same type of high-frequency exciter lamp oscillator and tilt-type tone control used in RCA Model 400 16-mm projectors, but the power output has been increased to 25 watts for the larger audiences which can be served with 16-mm arc projectors. There are individual mixer-type volume controls for the film sound channel, record player and microphone.

The main power circuit to the projector enters via the magnetic circuit breaker at the left end of the amplifier chassis. Its time constant allows for the arc-striking current surge, but it opens before a thermal line fuse of equivalent rating will blow. Accidental overloads therefore operate a protective device at the projector location, and not at some possibly distant or inaccessible point.

Figure 4 is a back view of the pedestal-amplifier case with the cable access door open. The two shielded-cable jacks at the left are for the pro-



FIG. 3. Pedestal - amplifier case with control panel removed to show amplifier chassis.

jector mechanism phototube and exciter lamp circuits, respectively. The phototube circuit is triple-shielded to prevent interference pickup from the relatively strong fields existing around the arc circuits. The phone jack and pair of terminals to the left of it are both the loudspeaker output circuit from the amplifier so that either temporary or permanent connections can be made.

The multi-terminal strip at the right allows the output impedance to be changed to match the characteristics of the loudspeaker equipment being used. The output circuit from an RCA MI-35102 Magnetic Reproducer Kit in-

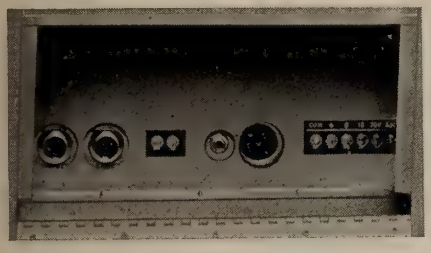


FIG. 4. Rear view of pedestal-amplifier, showing various connections.

stalled in the projector mechanism may be connected to either the microphone input circuit, if both photographic and magnetic sound tracks are to be run, or to the phototube circuit jack in the rear if magnetic tracks only are to be reproduced.

Projector Mechanism

Figure 5 is a close-up of the projector mechanism. Except for certain modifications and additions required by the arc application, it is the same as has been used for some years in RCA Model 400 16-mm projectors. Visible in the figure just above the picture gate assembly is the head of the cowl-lock fastener which locks the mechanism to the lamp. Below and to the left is the theatrical-type framer control knob which shifts the moving film with respect to the aperture, and directly below it is the speed-shift control which changes the film speed from 24 frames per second to 16 frames per second. The motor switch is at the bottom of the control panel.

Since it is impractical to interlock the projector motor and lamp power circuits as is done in incandescent lamp projectors, it was considered essential that the RCA Porto-Arc Projector incorporate an automatic film-speed operated fire shutter to protect the film in the event of accidental film stoppage.

'Latched' and 'Unlatched' Steps

By careful mechanical design, it proved possible to combine this function with that of a hand-operated "dowser" for keeping the light off the screen until the start of picture action. A centrifugal clutch was added to the regular picture shutter hub, and this clutch, via suitable linkage details, lifts an auxiliary shutter or "dowser" blade whenever the mechanism film speed exceeds 14 frames per second, and provided the manual control lever for it is unlatched. This lever is visible in Fig. 5 just to the left of the framer control and may be identified by its horizontal knob.

A simple notch in the lower edge of the lever provides the latched-shut feature. Slightly lifting the knob and pulling outward on it opens the dowser/fire shutter, but it will not stay open unless the mechanism film speed exceeds 14 frames per second as noted. Below this speed gravity forces in the linkage pull the blade closed, and it stays closed until the control lever is again manually lifted to unlatch it.

The housing for the 3450-rpm centrifugal blower normally associated with the projector mechanism's drive motor has been modified to provide strong cooling air blasts for the condenser lens, heat filter and picture aperture.

'Hard' Arclamp Details

Figure 6 shows the arc lamp with the operating-side door open and with the cover for the feed-ratio pulleys removed. The relatively small, compact housing design is made possible by the selection of a combination reflector-condenser optical system. In the Porto-Arc Projector the length of the lamp has been further reduced by mounting the condenser lens in the projector-mechanism housing.

The lamp is designed to operate with either the standard 30-amp., 28-volt Pearlex carbon trim, or with a new 10

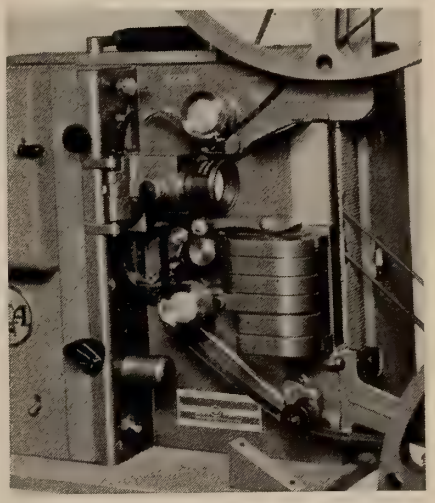


FIG. 5. The 16-mm projector mechanism.

amp., 50-volt trim. The 30-amp. trim, without heat filter in place and with the optical system adjusted for 70 percent side-to-center distribution, delivers 1600 lumens, using the two-blade 80-degree shutter normally supplied, and

(Continued on page 24)

FIG. 6. The carbon-arc lamphouse of the Porto-Arc.



IN THE

SPOTLIGHT

NO sooner had the impassioned pleas of high-ranking motion picture executives (in this case, Adolph Zukor and Y. Frank Freeman) died away in the chill air of exhibitor reluctance when the sponsors of various crackpot single-film 3-D systems blatantly announced that their processes would "reduce projection manpower."

It is apparent that the motion picture exhibition field will not hesitate to pay for expensive projection equipment, but will not protect its investment therein to the extent of supplying adequate manpower to efficiently operate and maintain that equipment.

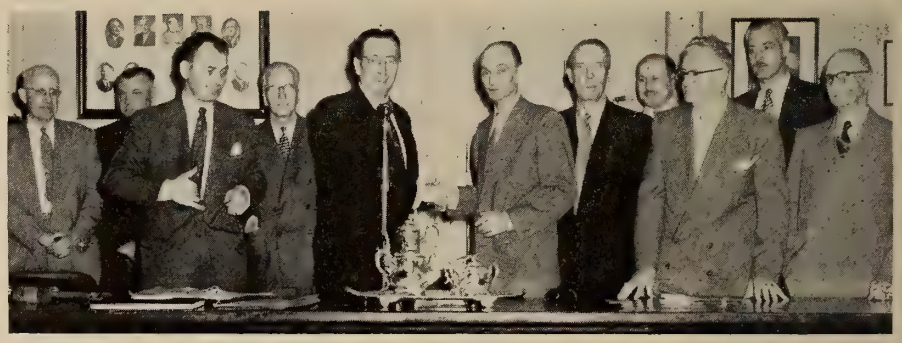
It becomes increasingly obvious that the mouthings of the so-called leaders of this industry are but mere catcalls in the economic jungle. At first terrified by the new technological processes, then a mite reassured by ascending box-offices grosses, these "great minds" reassumed their time-honored arrogance.

The investment that the exhibition field has made in new equipment within the past two years is just so much water over the dam if that investment be not protected by adequate operating and maintenance manpower. One may not "mothball" an apparatus that is designed to show a product intended to attract an hour-after-hour paying clientele. There is nothing static about the grim necessity for the ring of silver upon the box-office till—and nothing that the mealy-mouthed advocates of manpower "economy" may spout will ever serve to alter this basic fact.

• Local 203, Easton, Penna., celebrated its 43rd anniversary last month at a banquet held at the Easton Moose Home. The membership turned out en masse to celebrate the event which was highlighted by the presentation of silver honorary life membership cards to the three remaining charter members: James Dowling, chief projectionist at the State Theatre; Edward M. Black, projectionist at the Embassy Theatre, and Harry McIlroy, assistant carpenter at the State Theatre. These men held membership in the Local when it received an IA charter back in 1911.



Three charter members of Local 203, Easton, Penna., receive honorary life membership awards. Shown here, left to right: Harry Abbott, IA 3rd vice-president, who made the presentations; charter members Harry McIlroy, Edward M. Black, and James Dowling.



In recognition of many years of loyal and untiring services to Toronto Local 173, Jim Sturgess (center), president of the Local, is presented with a beautiful silver tea set. Pictured here at the presentation ceremonies are, left to right: Roy O'Connor, executive board member; Lorne Clarke, presentation committee member; Lou Lodge, secretary-treasurer; Gus Demery, chairman, presentation committee; Pat Travers, business representative; Sturgess, Art Kerrin, vice-president; Lou Applebaum, Dave Siegel, Roy Wilson, executive board members, and Bert Higgins, recording-secretary.

Kenneth S. Mack, president of the Local, presented copies of a scrapbook depicting the history of the theatre in



Members and guests of Local 332, Clinton, Iowa, as they gathered around the festive board in honor of the Local's recent 40th anniversary celebration. Pictured here, seated left to right, are Local members: A. E. Hubbard, secretary; James Wosoba, Andy Rutzbach, Clyde Baker, Charles Novotny, H. C. Andrews, president; Wm. Donnelly, IA 7th vice-president; Don Allison, mayor of Clinton; Paul Nadelhoffer, business representative; Charles Snyder, Bob Muhs, and Wm. Holdbrook. Managers of all the local theatres and many civic leaders were among the invited guests.

the Easton area to the award recipients and to Harry Abbott, IA 3rd vice-president, who made the presentations.

• Charles H. Travis, charter member, was presented with a life membership card in Local 314, Schenectady, N. Y. Travis has projected pictures for the past 46 years. In June 1953 he retired as projectionist at the Plaza Theatre, a position he held for 21 years.

• The many friends of Lawrence J. Katz, president of Local 488, Harrisburg, Penna., and IA representative, will be glad to learn that he is recovering from a serious indisposition suffered several weeks ago.

• IA Locals throughout the country contributed a total of $21,750 to the Will Rogers Memorial Hospital at Saranac Lake, as a result of the IA's 1953 Christmas Salute drive. This tops the previous year's contribution by $4,000.

• The stiff opposition of Chicago Projectionists Local 110 to the showing of the controversial motion picture film, "Salt of the Earth," has resulted in the cancellation of several widely-advertised bookings of this film in Chicago theatres. This feature, an independent production, has been blasted by IA Locals and American Legion posts throughout the country.

• A retirement fund, created jointly by Milwaukee Projectionists' Local 164 and the theatre exhibitors in its jurisdiction, has been announced by Oscar E. Olsen, the Local's business representative. This trust, which is financed by exhibitors paying a percentage of the projectionists' salaries into the fund, is administered by a six-man board of directors, three representing the exhibitors and three the Local. Harold J. Fitzgerald, president of Fox Wisconsin Amusement Corp., and Oscar E. Olsen are the co-chairmen. Glenn C. Kalkhoff and Robert O. Lucht are the other two union members serving on the board.

Under this trust fund a pension of $100 per month is paid to each member of the Local retiring at 65 years of age or older, and benefits are paid to members who are permanently disabled through illness or by accident.

At its first session, last January, the board retired eight members of the Local with pensions of $100 a month for life. These men, ranging in age from 67 to 76, are William Bodenstein, Hollie Fulmer, Alfred Bauman, George Mace, Arthur Westphal, Joseph Sasse, Jr., Jerome Washicheck, and Fred Lower. In addition, three other members—John Black, Herman Trampe, and Paul Bruder—were placed on the permanent disability list with payments of $100 per month.



Members of Local 676, Hornell, N. Y., at the Local's recent 25th anniversary celebration. Shown in the front row, left to right: Elliott Hazen, business representative; William Switzer, secretary, and George Griffing, president. Back row, left to right: Archie Tutton, Anthony Galeazzo, William Jackson, Jack Whitman, and Lynn Blackmer.

• The 25th anniversary celebration of Local 676, Hornell, N. Y., took place last month in the ballroom of the Moose Club in Hornell at the close of the annual Spring meeting of the N. Y. State Association of Motion Picture Projectionists. Delegates and guests of the Association were invited to the celebration, which was attended by prominent civic and top IA personnel. Sound movies of the Association's 1953 Fall meeting were shown, wherein President Tuttle stole the acting honors.

One of the features of the party was the presentation to the popular secretary of the 25-30 Club of New York City, Morris Klapholz, and his wife of a beautiful cake in honor of their 39th wedding anniversary. This very gracious gesture on the part of the Hornell Local is one that we are sure the Klapholz' will long remember and cherish.

• *Visitors from Out-of-Town:* James J. Gebhart, member of Local 515, Shamokin, Penn., and Mrs. Gebhart visited with the IP staff during their recent visit to this city. As a sideline, the Gebharts are expert locksmiths and had many an amusing story to tell of their experiences in this field.

From Toronto, Canada, came "Pat" Travers, the popular business repre-



Manuel Ayala and Alfred Pena, members of San Antonio Local 407, attended the Mexican STIC convention at Tampico, Mexico, as delegates from their Local. The Mexican union is equivalent to our IATSE. The white arrow points to Ayala.

sentative for Local 173, and B. Crowe, charter member of the Local. Harry Sherman, the late conductor of these columns, had a very warm spot in his heart for the Toronto boys and this regard has been passed on to the writer. We enjoyed these visits and look forward to more of them.

• The Iowa State Association held its 24th meeting on May 11 at the Blackhawk Hotel in Davenport, Iowa. Among the many topics discussed at the meeting was a pension and retirement plan designed primarily for labor unions. This plan was briefly outlined by Mr. Leo Frenzl, a specialist in such matters, who stated that IA President Walsh and General Secretary-Treasurer Holdmen showed much interest in the plan when he presented it to them.

William Donnelly, IA 7th vice-president and business representative for Minneapolis Local 13, addressed the gathering and urged that all Locals lend their support to the LLPE (Labor's League for Political Education). He stressed the importance of this organization in Labor's fight against unfriendly lawmakers.

Many of the delegates present reported that their Locals receive extra pay for preparatory time when showing pictures in the new processes. A number of them stated that their Locals get preparatory time regardless of the medium in which pictures are shown.

When the meeting adjourned, the delegates were the guests of Davenport Locals 85 and 433 at a midnight banquet held at the Labor Temple.

• Among the many interesting topics discussed at the recent semi-annual meeting of the N. Y. State Association of Motion Picture Projectionists was the all-important matter of welfare and pension plans. It became apparent that such plans vary widely among various Local Unions in a given state, such ramifications affecting adversely the security of the worker.

For example, Morris Klapholz, representing the 25-30 Club of New York City, told how the RKO and Loew's circuits eliminated their own welfare plan when the Local 306 pension plan became effective. It was emphasized that there now exists many so-called welfare plans which involve the contribution over a period of years by a worker who, upon being taken ill and forced to leave his theatre post, is unable to continue his welfare plan payments and thereby forefits any interest in and right to his accumulated payments.

Pension Collection Ratio

Another point of especial significance was developed during the discussions, namely, that statistics prove that only one out of ten men may expect to benefit from the various pension plans now in effect, and then for only a limited period of three years.

It would seem to be the part of wisdom for the most comprehensive and intensive exchange of information anent such welfare and pension plans among the various units of a given craft. Insurance companies specializing in this form of underwriting have amassed a great wealth of data thereon which they will be only too glad to make available to any interested parties.



Dr. Leon W. Wells (center) who developed the Pola-Lite 3-D system, explains the details of the single-track 3-D projection attachment to Wilfred Dawson, left, and William Esperti, right, members of Detroit Local 199 and projectionists at the Roxy Theatre in Detroit, where this unit had its premiere showing.

• The AF of L and CIO Peace Committees met in Washington, D. C. on June 9 and signed no-raiding pacts. AF of L President George Meany and CIO President Walter P. Reuther attended the meeting. This is said to be the first step in the long drawn out negotiations to bring about a merger between these two labor organizations.



Shown in attendance at the recent Iowa State Association meeting which was held in Davenport, Iowa. Back row, left to right: Ray Jiruska, L. 191, Cedar Rapids; Richard Murphy, L. 85, Davenport; Paul Nadelhoffer, L. 332, Clinton; Fred Parker, L. 433, Davenport; next six unknown; Theodore Garretson, L. 433, and Bruce Watson, L. 238, Muscatine. Middle row: J. R. Marksbury, L. 355, Sioux City; A. E. Hubbard, L. 332; Harold Weigand, L. 450, Mason City, and Edward DeBorde, L. 67, Des Moines. Seated, front row: James Seese, L. 202, Waterloo; Clyde Cooley, L. 343, Omaha; George Brayfield, IA trustee; Wm. Donnelly, 7th IA vice-president; Robert Olson, L. 509, Duluth, Minn. (president of Minnesota State Federation of Labor); Louis Lannon, L. 103, Dubuque; George Stoddard, L. 433, and Burt Martin, L. 40 and 355, Mason City. Gordon E. Beck, president of the Association, is shown in front center.

IA OBITUARIES

FLOYD WOODSMALL, 42, member of Local 164, Milwaukee, Wis. since 1937, died suddenly last month at his newly completed home at Nagawicka Lake, to which he recently moved his family. He was employed as projectionist at the Fox-Princess Theatre in downtown Milwaukee. He is survived by his wife, two daughters and a sister and a brother.

J. A. BAINBRIDGE, one of the oldest members of San Francisco Local 162, died early this month. Although he retired some years ago from all activities, he maintained his interest in Local 162 affairs. During the early years of his career, "Bainy," as he was affectionately known to all his friends, was in the theatre supply business, in charge of the S. F. agency for the Powers projectors.

WALDON MCDONALD, member of St. Louis Local 143, succumbed to fatal injuries sustained in an automobile accident last month. In addition to working as projectionist he operated a theatrical agency.

LETTERS TO THE EDITOR

Splicing CinemaScope Prints

To the Editor of IP:

I hear and read complaints that CinemaScope film is difficult to splice. I have also heard it suggested that the best way to insure good splices on CinemaScope film is to bring a "hot" splicer into the projection room.

I believe that the proper approach to splicing CinemaScope film is only slightly different from methods used all along. The fact that the sprocket-hole dimensions of CinemaScope film are smaller than standard, and that the magnetic-sound striping is on the opposite side of the film base from the emulsion, are the only two factors that make splicing different. At Loew's we solved this problem by purchasing the recently-marketed Neuscope splicer (Neumade Products) which is designed especially for CinemaScope.

In my opinion, there is no more reason for using a "hot" splicer on CinemaScope than on any other film. In addition, with all the extra equipment that the projectionist has been required to handle during the past year, it is confusing and unfair to suggest that additional equipment in the form of a "hot" splicer is also needed.

One-Operation Procedure

The advantage of the Neuscope splicer is that once the film is positioned in the splicer, it is not removed until the splice is completed. If a standard bench splicer is used, it would be necessary to remove both ends of the CinemaScope film from the splicer during the process so that both edges could be scraped and the magnetic striping be removed from the splice area as well as the emulsion. Also, the register pins of the Neuscope splicer are made to fit CinemaScope sprocket dimensions.

The film is placed in the Neuscope splicer in the same way as formerly with the Griswold bench splicer. Using the wire-brush and scraper unit available with the splicer, scrape the left-hand film section. Then swing the right-hand jaw to wide-open position and remove the magnetic tracks from the base side of the right-hand film section with the wire brush, roughening the base at the same time.

Apply any good commercial cement, and clamp the splice, allowing a setting time of approximately 20 seconds. Open the splicer and remove the film. Result —a perfect patch.

All this is done with the aid of a simple bench splicer designed especially for CinemaScope film and without the aid of a "hot" splicer. Although it may have value in the film laboratory or in the exchange, I feel that a "hot" splicer is out of place in the modern projection room.

M. D. O'Brien
Director, Sound & Visual Projection,
Loew's, Inc.

Good Lens Tissue Available

To the Editor of IP:

We agree in the main with the comments made by Robert A. Mitchell in the article "The Lens: Key to Projection Quality," which appeared in your April issue. The suggestions made therein provide an excellent basis for proper procedure in the care and maintenance of the high-quality lenses we now use, and, moreover, emphasize the "don'ts" which, if employed, would impair lens performance.

However, we think that on page 33 of the aforementioned article the several paragraphs devoted to cleaning lens surfaces should be clarified: the phrase "do not use 'lens paper,'" should definitely not be construed to mean that there is *not* an effective lens *tissue* available. We have long supplied a lens tissue to the industry which has received the approval of all the major film research laboratories.

The cleaning of a good lens is a matter of paramount importance in the projection field, hence we think it inaccurate to leave with your readers the impression that there does not exist a *wholly acceptable* lens-cleaning tissue and lens-cleaning fluid. Yours for better projection.

S. K. Rosenstein
Rosco Laboratories, 367 Hudson Ave.,
Brooklyn, N. Y.

Ratios, Balcony, Curved Screen

To the Editor of IP:

For the most part I concur with your article in the April issue of IP. However, I like the 2.55 to 1 ratio of Fox. It is nearer the natural field of vision than that of any other reproduction system. Also, do not overlook a competitive comparison. The old 3 x 4 ratio, or even 2 to 1, permits too close association in the viewer's mind with Tv.

Like any other new device or tool, the industry must learn to use it to best advantage. CinemaScope should be installed with screens from wall to wall. It is most important not to distract the viewer's attention with organ lofts, auditorium ornamentation or other adornments of no particular value in a movie theatre. The balcony is as outmoded as the Model "T". It is both an economic and technical liability.

Of course the screen should be flat. Cut through the fog of optical misinformation, and it is quite simple. A projection lens magnifies a flat image obtained from a flat film. Perhaps more harm has been done to the industry by the giant curved screen than any other crackpot idea ever offered.

Donald E. Ball
809 Division St., Clarks Summit, Pa.

Accolade From the Antipodes

To the Editor of IP:

Each month this Union receives regularly three copies of International Projectionist. These I distribute to local projectionists and other members of this Union. After their return, copies are filed for reference. The contents of your magazine are always of interest, especially to projectionists in this part of the world who find the technical articles of great help to them.

R. Kirk,
Honorary Secretary
Otago and Southland Projectionists' Union, Dunedin, C.I., New Zealand.

Wire Brush Not Needed

To the Editor of IP:

When reading the "What's Your Problem?" column in the March issue of IP, I noticed that the writer practically demanded that a wire brush be standard projection room equipment for splicing CinemaScope film. I find, after running seven different CinemaScope pictures, that the brush is not necessary. If you place the film in the splicer with the sound tracks up and apply a little film cement to the sound tracks to soften them up, the regular emulsion scraper supplied with the splicer can remove the magnetic striping with ease. Try it. It works!

Harold L. Weigand
Mason City, Iowa

[Editor's Note: It would appear that Mr. Weigand is talking about splicing CinemaScope Film with a *standard* splicer. The information in IP about the wire brush referred to its use in connection with the new Griswold splicer designed especially for CinemaScope. The pressure clamp assembly on this splicer requires use of the brush if best results are to be obtained.]

From Muybridge To CinemaScope

By JAMES CARD
Curator, George Eastman House

AN EPOCH started on May 4, 1880. Edweard Muybridge projected on a screen his moving picture studies of animal locomotion. Spectators were members of the San Francisco Art Association and gentlemen of the press. One reviewer reporting his show the next day in the *San Francisco Alta* wrote: "Mr. Muybridge has laid the foundation of a new method of entertaining the people."

From that 1880 date until the end of the century, motion picture inventions crowded the files of patent offices around the world. The activity reached a peak in 1896. In 1895 the first film fans in France, Germany, Switzerland, Great Britain and the United States were responding to their earliest chance to buy entertainment furnished by motion pictures.

In five years' time there was already too much from which showmen could choose. By 1900 there were available sound films, trick films with stop-motion effects and multiple exposures, news features, story films and movies in color. Fifty-four years ago, they even had Cineorama and the wide-screen (69 feet wide, by the way).

The Paris Exposition

All this was displayed in dazzling profusion at the great Paris Exposition celebrating the advent of the Twentieth Century. It was there that the voices of Sarah Bernhardt and Coquelin spoke from motion picture screens. It was there that Cineorama, the patented invention of Raoul Grimoin-Sanson, made its debut.

Today's version, the Cinerama is less than half of what the 1900 spectacle was. Instead of just three synchronized cameras and projectors, Sanson used ten. Instead of a screen 25 feet high, the French inventor used a screen 30 feet in height that completely surrounded the spectators. In 1900 the watchers stood right in the middle of a gigantic moving picture, projected in color from ten synchronized movie machines, merging ten separate films into a single vast, encompassing scene.

At the same exposition there was a wide-screen presentation that would have impressed today's most ardent champions of CinemaScope: the brothers Lumiere showed their films in color, on a gigantic screen 48 by 69 feet and seated 25,000 viewers at a single session.

Flood of Inventions

Invention had come too fast. The movies were too rich in ideas. The flood of brilliant devices given to the world by 1900 could not be absorbed commercially in a field so new. In a few years, for practical purposes, the movies were stripped to the essential novelty: images in movement.

The bones of nearly everything basic to the medium today were then stored away in the closets of the movies' past—skeletons of the wondrous systems destined to delight beholders in the new century.

Sound — dialogue — color — and 3-D each remained for the most part hidden in the past, each awaiting its cue for the proper time to be brought out and appended once again to the moving image that is the heart of the cinema.

Each time, it was to meet a crisis that one of these old treasures was brought out of the shadows of the nineteenth century and dramatically presented anew to the jaded public eye.

Radio Competition

Back in 1926, radio provided the crisis. From the time of Edison's first film experiments, there had been attempts at talking pictures. By 1912, Gaumont was producing elaborate dialogue films with sound effects and musical accompaniment. Sound-on-film had been developed as early as 1908. But the time was not at hand to catch the public ear. From 1912 to 1926 the film held its tongue. The movies kept their silence until the radio forced them to speak up.

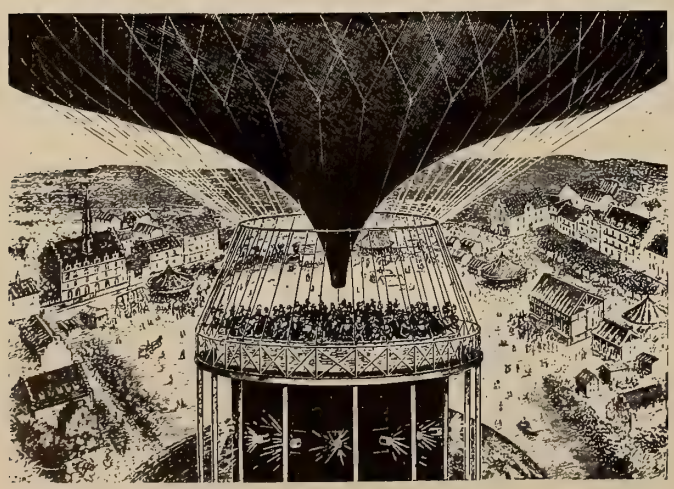


Muybridge photographs like these, produced by multiple cameras operated by strings attached to electric switches which controlled the shutters, proved that a horse in a gallop lifts all four feet off the ground at once. These photos, made to settle a bet, are a milestone in motion picture history.

The silent film was threatened by the new device. Thousands of head-phoned Americans were staying home to carefully guide cat's-whiskers to the highest spot on the crystals of bed-side radio sets. Then came the loudspeakers and the whole family seemed in danger of preferring the static from KDKA to the mute allure of Hollywood's most sparkling shadow stars. The movies met this audio challenge in 1926 with Vitaphone and movietone.

Now a new challenge has been hurled at the cinema. This time the attack came from television in an area where the movies seemed most secure — in the field of sight rather than sound. The film men have countered with visual displays of stereo effects and larger screen sizes, all devices a half-century old.

The movies still have all manner of surprising devices stored undeveloped in their past that await only contemporary vision and energy to adapt them to present usefulness. We are still living in the age of vision.



The Cinerama of Raoul Grimon-Sanson was featured at the Paris Exposition of 1900. Ten synchronized projectors gave a 360 degree picture. The spectators stood in the middle of this huge moving picture.

Governor Leland Stanford of California made the bet; Muybridge tackled the tough photographic job. After many trials, the latter lined up a number of cameras along

a track. Eventually he attached strings to electric switches that controlled the camera shutters. When a horse galloped past, it broke the strings one after another. The shutters were released and negatives made in a series. The photographs proved that Governor Stanford was right. The feet were off the ground during the gallop.

Filled Still-Motion Picture Gap

Muybridge was a pioneer in instantaneous photography. His work fills the gap between still and motion picture history. While he set out to eliminate motion by stopping it in pictures, in 1880 he also projected photos intermittently. This produced motion on the screen, thus anticipating motion picture.

His projected pictures of horses in motion amazed audiences. *The San Francisco Call* of May 5, 1880, reported that "nothing was wanting but the clatter of the hoofs upon the turf and an occasional breath of steam from the nostrils, to make the spectator believe that he had before him genuine flesh-and-blood steeds."

Battery of 24 Cameras

Later Muybridge went to Philadelphia where he continued his work at the University of Pennsylvania from 1883 to 1885. Here he perfected his equipment. He also turned to use of the new dry plates for shorter exposures. The results of his work were published in a series of 781 illustrations on animal locomotion. For his pictures he used horses and animals of all kinds from the Philadelphia Zoo as well as human models.

Muybridge's photography at Philadelphia was done outdoors against a black background. Opposite the background he had a battery of 24 cameras. A camera in the collection at Eastman House is one of these. Also in the collection are Muybridge's notebooks, 13 albums containing a large number of his duplicate negatives, and an album of albumen prints which are considered to be the best of his work.

A Universal lens mount designed to permit quick switching from CinemaScope to standard 3 by 4 projection during a show is shown below. Designed and produced by Dave Corbett, of Projection Products, N.Y.C., the device makes possible vertical and horizontal adjustments of the projection lens to compensate for the slightly different position of the CinemaScope and standard apertures in relation to the projector optical train. Without this correction, neither picture will be centered accurately on the screen.



The Marauders Mutter

The "accompanying literature" mentioned in the appended communication could hardly be news to IP readers for the reason that Mr. Mitchell has in his contributions to IP been both meticulous and far-ranging in his comments on projection technological developments.

In Anguished Tones

VEB ZEISS IKON DRESDEN

International Projectionist
Publishing Co., Inc.
19 West 44th Street,
N e w Y o r k 36, N.Y.

Einschreiben !

TEP Stu/Hfm/1582 292 23.2.1954

"International Projectionist", Nr. 12/1953, Seite 7.

In Heft 12/53 Ihrer Zeitschrift "International Projectionist" veröffentlichten Sie einen Artikel von Herrn Robert A. Mitchell unter dem Titel

"Recent Projection Advances in Europe".

Den Ausführungen dieses Artikels über die kinotechnische Entwicklung im Gebiete der DdR (Ostdeutschland) mussten wir entnehmen, dass Herrn Mitchell unsere Neuentwicklungen an Theatermaschinen nicht bekannt sind.

Wir erlauben uns deshalb, Ihnen Prospektmaterial über die von uns hergestellten Theatermaschinen vom Typ D 1 und D 2 zur Verfügung zu stellen. Beim Studium dieser Prospekte werden Sie feststellen, dass es sich bei diesen Maschinen gegenüber der Ihnen bekannten Ernemann VII B um grundsätzliche Neukonstruktionen handelt, die eine Reihe von wesentlichen Neuheiten aufweisen.

Wir würden es begrüssen, wenn Herr Mitchell als international bekannter Kinofachmann dem Leserkreis des "International Projectionist" von diesen beiden neuen Maschinen Kenntnis gibt und bitten Sie, ihm unser Schreiben und das beigefügte Prospektmaterial zur Verfügung zu stellen.

Anlagen.
D 1 - Bilderliste
D 1 - Betriebsvorschrift

Hochachtungsvoll
VEB ZEISS IKON
(Netz) (Weichelt)

Translation:

IN THE 12/53 number of your periodical, "International Projectionist," you published an article by Mr. Robert A. Mitchell under the title:

"Recent Projection Advances in Europe"

The absence of material in this article on motion-picture technological progress in the People's Democratic Republic of Germany (East Germany) forces us to the conclusion that Mr. Mitchell is unacquainted with our new developments in theatre machines.

We take this opportunity, therefore, to place at your disposal descriptive material on the Type D1 and D2 theatre machines manufactured by us. On studying these bulletins you will have to admit that these projectors, in comparison with the Ernemann VII-B with which you are already familiar, reveal a basically new construction and quite a number of substantially new features.

We should appreciate it very much if Mr. Mitchell, as an internationally - known motion - picture technologist, would acquaint the readers of "International Projectionist" with both of these new projectors, and we also ask that you send him our communication and the accompanying literature.

Yours very truly,
VEB ZEISS IKON, DRESDEN, GERMANY

Mitchell Comment:

EXAMINATION of the literature on the *D-1* and *D-2* projectors reveals a radical rearrangement of Ernemann-type projector parts, the whole enclosed in an *unorthodox* housing. I do not, personally, care for this type of enclosure or for the square, and rather primitive, construction of the lamphouse.

The lower part of the mechanism itself, containing the sound reproducer, seems rather cramped, though mechanically good design. Having no information on the quality of the materials and workmanship in these two projectors, I can offer no comment on their performance. On the whole, these projectors, while possibly noteworthy, do not seem to incorporate significant features of really new conception — apart from the housing and arrangement of the controls.

Quick Projector Reversal

According to measurements just completed by the Eastman Kodak Co., it takes less than one second to achieve a complete reversal from forward sound speed to reverse sound speed with the Kodak Analyst projector. The Analyst, designed for use by athletic coaches and others who want to be able to rapidly reverse projection for motion study purposes, is equipped with a hand-held, push-button, reversing switch for maximum ease in projection control.

NEW RCA PORTABLE 16-MM 'PORTOARC' PROJECTOR

(Continued from page 17)

an F/1.6 lens. The 10-amp. trim under the same conditions delivers 850 lumens which is in the order of twice the available from ordinary incandescent-lamp 16-mm projectors.

Burning Times, Controls

One 30-amp. trim lasts 56 minutes, which accommodates a 2000-foot reel at 16-mm sound speed. By contrast, the 10-amp. trim burns 2 hours 15 minutes, which accommodates 4000-foot reels, though special feed and take-up facilities, which are being designed, are required.

In Fig. 6 the outer edge of the elliptical reflector or mirror shows approximately in line with the left edge of the heat shield on the opened door. It is 7½ inches in diameter and is mounted on a vertical baffle within the arc lamp by a three-point, spring-seated suspension. The center of the mirror is over 3 inches behind the arc to reduce fogging tendencies from arc gases.

Two control knobs extending to the back of the arc lamp from the reflector's spring-mounted support frame provide tilt and training adjustments for uniform illumination of the projector-mechanism aperture. The working distance of the mirror alone is 25 inches but for the combination of mirror and condenser the working distance is less than 17 inches. The optical speed of the combination is approximately F/1.6, which matches well with the speed of the fastest projection lenses customarily used.

Condenser Arrangement

The condenser lens is situated about 13 inches from the mirror and is made of heat-resistant glass. It not only performs the optical function noted, but also effectively serves as a barrier to prevent cooling air currents from disturbing the arc. The condenser lens is mounted in a pull-out carriage visible in Fig. 6 just above the RCA monogram.

Other items of interest visible in Fig. 6 are the positive-carbon holder and carbon-tip guide, which are designed to obstruct the minimum possible light from the reflector. To the rear of the mirror supporting baffle is the negative-carbon holder, and just below it may be seen the mercury interlock switch actuated by the lamp door.

Double Feed Screws

When the lamp is in operation the two carbon holders are moved slowly toward each other within the lamp base by their supporting carriages, which ride on two longitudinal feed screws. The carriages may be manually positioned along the screws for arc trimming and striking by means of the control knobs operating in the slots just below the door opening. Stops for the carriages cause the feeding action to cease when carbons burn down to stubs 2 inches long, thus preventing accidental damage to holders and tip guides.

The ends of the feed screws protrude through the rear of the lamp housing as shown and support double-groove spring-belt pulleys. Moving the belt from one set of grooves to the other changes the negative/positive feed ratios to suit the relative burning rates of the two different carbon trims for which the lamp is designed.

The feed screws are driven by a specially wound D.C. series motor connected to the arc circuit via an arc-current operated relay so that feeding action does not begin until the arc is struck. This effectively prevents accidental freezing of the carbons if power is inadvertently left on without striking the arc. The series motor circuit includes the average feed-rate control rheostat shown just to the left of the arc-current ammeter.

Arc Stabilization

In addition to the normal series motor-type field windings, the feed motor carries an additional field winding through which the arc current passes. The combined forces of the resultant fields provide a very effective stabilization action for the burning arc; for example, if the arc current tends to rise, say because the line voltage has gone up a few volts, the feed motor slows down so the arc gap lengthens slightly to bring the current back to the former value. The reverse action occurs if the current tends to fall.

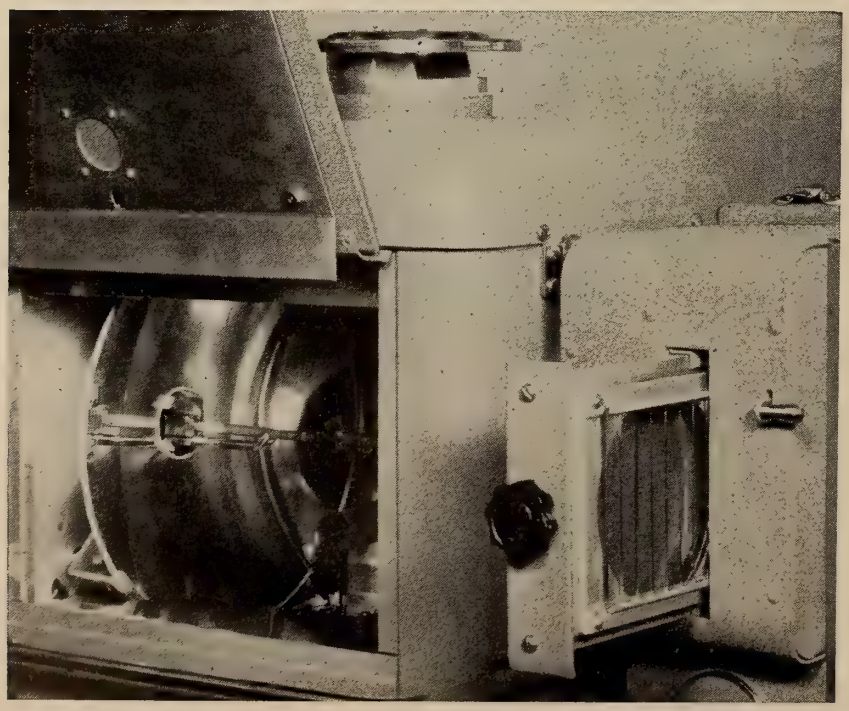
Figure 7 is another close-up of the arc lamp with the condenser carriage pulled out to show the heat filter. Also visible in this view is the rigid-tip guide for the negative carbon. The filter-glass strips are carried in an auxiliary holder which is easily slipped in or out of mating guides on the condenser carriage as shown.

Experience to date has shown that with the degree of aperture cooling provided it is possible to run nearly all color films safely at 30-amp. operation without the heat filter because they are relatively transparent to the longer-wavelength radiant energy. The heat filter is usually required for black-and-white films unless they happen to be of rather low density. The filter is essential for all types of film when operating at the projector's 16 frames per second film speed, but is not usually required for sound-speed 10-amp. lamp operation.

Ventilation System

At the top of the lamp in Fig. 7 the ventilation chimney shows. It incorporates a scoop-shaped inner section, extending downward just above the arc to the edge of the light beam, which

FIG. 7. The projector's heat filter, a unique feature of Porto-Arc design.



serves as a collector for the carbon electrode combustion products produced by the burning arc. The chimney assembly pulls out for cleaning; the dust washes off easily in cold running water.

Two openings are visible in the heat shield on the inner surface of the opened lamp door in Fig. 7. The larger opening is provided with heat-resistant dark glass for observation of the burning arc. The smaller opening is the port through which light from the arc enters the mirror assembly of the lamp's "arcoscope" on the outer door surface. Referring to Fig. 2, which shows the door closed, the mirror assembly is seen just above the observation port, and it throws images of the brilliant carbon tips to the white screen directly below it.

Arc-to-Mirror Adjustment

During initial testing of the lamp and projector mechanism the position of the burning arc with respect to the mirror is manually adjusted for maximum light output consistent with approximately 70 percent side-to-center light distribution on the screen. Lines are then scribed on the arcoscope screen marking the corresponding carbon-tip positions, and these lines become the references for subsequent lamp operation. As a rule, mirror characteristics are within tolerances which permit mirror replacement without scribing new reference lines.

Figure 2 also shows the 30-amp. rectifier in place under the pedestal-amplifier. The 10-amp. rectifier is identical in exterior appearance. These rectifiers are used to convert alternating current from the power line to direct current required for proper operation of the arc. The 30-amp. rectifier uses two standard 15-amp. gas rectifier tubes; the 10-amp. rectifier uses two 6-amp. tubes. Both rectifiers are provided with primary tap switches to accommodate varying line voltage and load conditions.

Box-Office Tv Appeal to FCC

Skiatron Tv Corp. will file a petition with the FCC for Federal approval of the various systems of collecting a fee from viewers of special Tv programs. Zenith Radio Corp. has already filed on behalf of its PhoneVision system. The Skiatron system requires no connection with telephone or other outside carrier lines, but functions by means of a coded card which "unscrambles" the special Tv program when the card is inserted in an apparatus attached to the Tv set.

Another box-office Tv system is Telemeter which, half-owned by Paramount, works by means of an electronic coin box attached to the set. It is now being tested on the West Coast.



Super Snaplites are better indoors or out. Sharper Pictures, Greater Contrast, More Light, Better Definition all add up to happy patrons. Make your Movies Better Than Ever; use Super Snaplite lenses. Super Snaplite Projection Lenses give a true speed for f/1.9 in every focal length up to 7 inches. Ask for Bulletins 207 and 209.

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The Xenon Gas Lamp for 16-mm Projection

The Xenon lamp, a small quartz envelope lamp developed originally for searchlight work, has lately been found adaptable for use in 16-mm projection. At the moment of merely academic interest to professional projectionists, this lamp is a fruitful source for speculation, since it is much brighter than the usual tungsten light source.

A descriptive paper on the Xenon lamp was read at the Spring convention of the SMPTE in Washington, D. C., where a comparative test was made of the screen images from two projectors, one equipped with a Xenon arc or gas lamp and the other with a standard tungsten lamp. The Xenon lamp was said to provide 2000 lumens of light to the screen compared with 500 from the tungsten source.

Because 16-mm projection will, in all likelihood, continue to use a tungsten light source primarily, the basic problem in developing a light source with a much higher output was to closely approximate the characteristics of the Mazda lamp for which 16-mm prints are balanced.

Emits Bluish Light

While the Xenon arc stream inside the quartz envelop is of much higher color temperature than Mazda light source and the blues are somewhat accentuated in the projected picture, the increased light output plus the balancing presence of red is considered to more than compensate for the difference in color temperature in many applications.

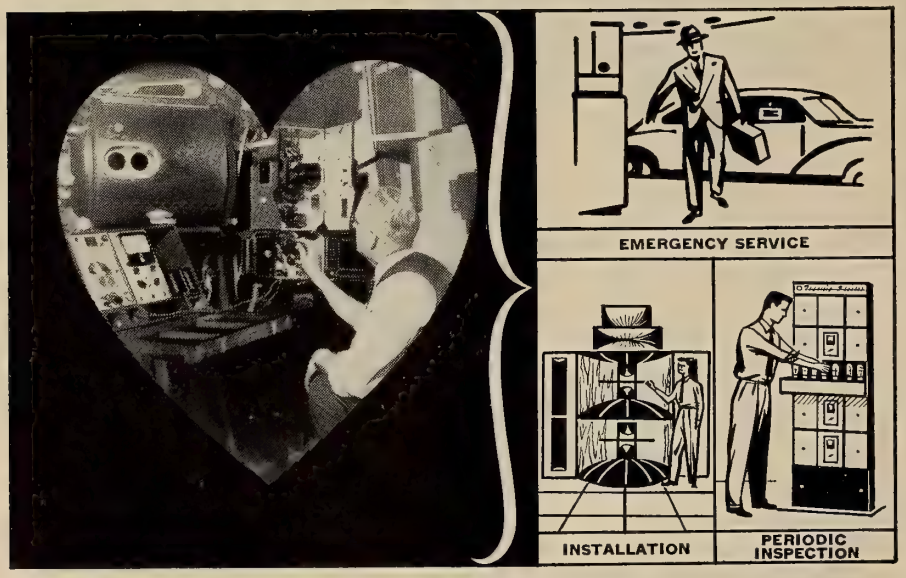
An interesting feature of the Xenon lamp is that it has been designed to eliminate the shutter from projection. This is done in the following way:

When supplied with alternating current, the lamp ignites on each alteration or twice per cycle. When supplied by a 60-cycle source, 120 light pulses per second originate between the electrodes of the lamp. Therefore, since the 24 pictures per second speed, which is standard for sound film, is an even multiple of the 120 light pulses per second, the shutter can be eliminated if a special ballast circuit shapes the alternating current so that the film pulldown is accomplished when the lamp is dark.



Xenon gaslamp (left) as contrasted with standard tungsten lamp.

The paper on the Xenon arc presented at the SMPTE convention was read by E. W. D'Arcy, now with the Bell & Howell and formerly with DeVry, a company which has done development work on the Xenon lamp for motion picture projection.



Call RCA for SERVICE on STEREOPHONIC sound

More than 25 years of knowledge and experience in the installation and maintenance of all kinds of theatre sound systems assures you top standards of performance in *Stereophonic Sound.*

In addition, thoroughly dependable, prompt and courteous service are yours when you call in RCA Theatre Service.

RCA Service Company, Inc.
A Radio Corporation of America Subsidiary
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JACKSON'S Reel-End Alarms
Automatic, not Electric! Projectionists' Favorite! Patented — truly Dependable!
$21.50 per pair
on money back guarantee
Test one at your dealer or write to
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2300 First Ave., Seattle 1, Wash.

ETHYLOID FILM CEMENT
FISHER MANUFACTURING CO. 1 SALTER PL. ROCHESTER 13, N. Y.

Magnetic Sound Recording; How It Was Developed

The discovery of magnetic sound recording and reproduction processes is by no means recent. Although it went into use in the projection room only a short time ago, magnetic reproduction was first introduced at approximately the same time that the motion picture itself was discovered.

The first magnetic recorder was shown to the world in 1898, just 10 years after George Eastman revolutionized photography with his development of the roll film and made the motion picture possible. It was at that time that a Danish scientist named Vlademar Poulsen developed a wire recorder that was designed primarily for dictation.

Steel Wire First Medium

This machine was both mechanically and electrically inefficient, but it effectively demonstrated the working principle of converting electrical energy into magnetic fields of varying intensity, impressing these magnetic fields upon a moving magnetizable medium, and later reconverting these recorded magnetic fields back into electrical energy.

Steel wire was the magnetizable medium in all early experiments with

What are the facts about

CANCER OF THE LUNG...?

JUST 20 YEARS AGO, in 1933, cancer of the lung killed 2,252 American men. Last year, it killed some 18,500.

WHY THIS STARTLING INCREASE? Our researchers are finding the answers as rapidly as funds and facilities permit—but there isn't enough money.

DOCTORS ESTIMATE that 50% of all men who develop lung cancer could be cured if treated in time. But we are actually saving only 5%...just one-tenth as many as we should.

WHY—? Many reasons. But one of the most important is not enough money . . . for mobile X-ray units, for diagnosis and treatment facilities, for training technicians and physicians.

THESE ARE JUST A FEW of the reasons why *you* should contribute generously to the American Cancer Society. Please do it now! *Your* donation is needed —and urgently needed—for the fight against cancer is *everybody's* fight.

Cancer
MAN'S CRUELEST ENEMY
Strike back—Give
AMERICAN CANCER SOCIETY

DRIVE-INS THROUGHOUT THE COUNTRY KNOW WHY...

It's Smart to do Business with

NATIONAL
THEATRE SUPPLY
Division of National • Simplex • Bludworth, Inc.

Service...
Planning, Engineering, Blueprints, Know How!

Service...
Convenient payment plans, pay out of income!

Service...
One source for all your needs!

magnetic recording. Although patents for coated tape, the medium that has now been adapted into a motion picture sound track, were granted in both the United States and in Germany in 1927, coated magnetic tape did not come into use for a long time afterward.

The German Broadcasting Co. used a steel tape machine in 1935 for mobile pickups. When American manufacturers began to manufacture magnetic recorders, they completely ignored the earlier patents on coated tape and concentrated on wire recorders.

It was only after World War II that it was discovered in this country that paper and plastic magnetic tape could be developed to such a high degree as to supercede all other forms of recording. Manufacturers then leaped on the bandwagon, and further development in the tape recording principle during the late forties resulted in the magnetic sound stripe, a thin stripe of magnetic tape which was applied to processed movie film for use as a sound track.

1953 saw the introduction of the CinemaScope sound system, four narrow magnetic sound tracks placed on one strip of film along with the picture. Now, more than 50 years after their invention, motion pictures and magnetic recording have been combined.

Navy Releases Electronics Course

A course in electricity and basic electronics, designed to present the essentials for advanced study or specialization, will shortly be published by John F. Rider, 480 Canal St., New York. The course, originally developed by the Navy for use in its schools, is regarded as being extremely simple and effective in its approach, and understandable to those without previous technological training.

NORPAT Selenium Rectifiers

A line of heavy-duty selenium rectifiers has been marketed by Norpat Sales, Inc., New York. M. D. Faige, Norpat president, states that "every major part of the rectifiers from the 50,000-hour selenium stack itself to the line transformers has been designed to meet and surpass NEMA specifications."

All models, large and small, have full glass insulated transformers. Ripple is held to 1%, and with 12-phase full-wave rectification, giving 720 impulses per second, results in a very low flicker, according to the manufacturer. By means of a 21-position, 8-point switch, wired to each phase of the 3-phase line transformer, output current and voltage are controlled to the arc.

Operating Safety Factors

In addition to a thermal switch, which shuts off the unit in the event of fan blower failure to prevent damage to the transformer and stacks, an audible signal device is provided to warn the operator of excess temperatures. This would enable him to install an auxiliary floor fan at once and prevent failure until there was time to check the cause.

Every unit is coated against corrosion and humidity effects. The equipment

GREATEST NEWS YET IN THEATRE SOUND!

PERSPECTA STEREOPHONIC SOUND

Multi-directional sound on a standard optical track

This is it! The simple, permanent sound system that solves all the exhibitor's stereophonic sound problems—and it's fully compatible with conventional sound systems. Projection procedures remain the same, too.

Exhibitors with stereophonic sound can switch to Perspecta Stereophonic Sound by installing only an integrator unit, design-engineered by Fairchild. Theatres equipped for conventional sound need only that single miracle unit plus additional power amplifiers, loudspeakers and a multiple gang fader.

REMEMBER! *MGM, Paramount and Warner Bros. are now filming all productions with this new technique.*

See your theatre supply dealer for full information or write:

FAIRCHILD RECORDING EQUIPMENT

MOTION PICTURE SOUND DIVISION • WHITESTONE 57, NEW YORK

SPLICES NOT HOLDING ?

Film breaks are costly. Play safe by using

JEFRONA

All-purpose CEMENT

Has greater adhesive qualities. Don't take our word for it. Send for FREE sample and judge for yourself.

CAMERA EQUIPMENT CO.
DEPT. J-6-8
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LARGE-CORED Lorraine ORLUX SUPER-CHARGED Carbons

For CINEMASCOPE 3-D, Drive-Ins, and other Wide Area Screens

CARBONS, Inc. BOONTON, N. J.

is designed for 50/60 cycle operation, and rectifier stacks are rated for 50% voltage overloads and for continuous duty at 25% current overloads. Completed equipment is tested for prolonged periods at 25% overload. Detailed test reports, approved by chief electrical and mechanical engineers, accompany each unit.

Projection Tv for Home

An improved projection-type Tv receiver is under development by the Skiatron Electronics and Television Corp. The projector, said to substitute an "ultrasonic" cell for the usual cathode or picture tube, is being designed to provide a picture 3 by 4 feet with a degree of brightness equal to that of a 16-mm home movie.

The company hopes that the projection portion of the set can be constructed with approximately the same proportions as a 16-mm projector. Sound equipment would vary in size and complexity, depending on what sort of reproduction is desired. The company is aiming at a selling price comparable to a 21-inch Tv set of the standard type.

British Technicians Protest

The British Association of Cinematograph Technicians will bring the "utmost pressure" on American companies producing films in England to turn out pictures "essentially British in character" and to employ British stars and technicians. The group also plans to press for a government-owned theatre circuit to compete with England's large private theatre chains.

Surface Wiring for Drive-ins

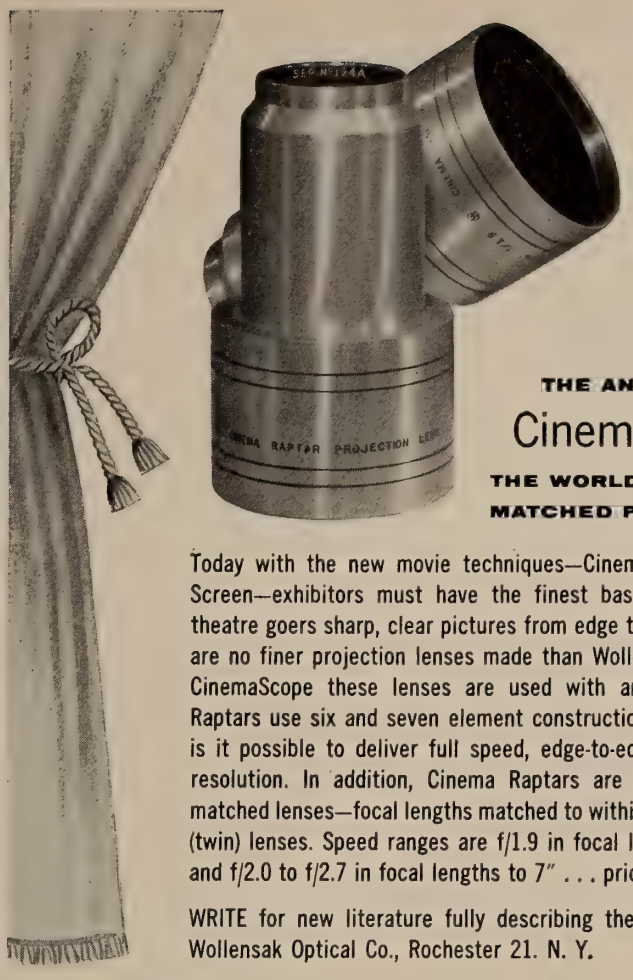
Magnasync Co., Hollywood, is completing tests on an inexpensive surface-wiring procedure for drive-ins that would involve a heat-and shock-resistant cable laid on the surface of a field and covered with asphalt.

National Theatres' Profit Dips

National Theatre Circuit has announced a decline in profits for the six-month period ending March 27, 1954. Consolidated net profit for the chain and voting-controlled subsidiaries during this period totaled $1,307,050, or 47 cents a share, compared with $1,458,529, or 53 cents a share, for the corresponding period in 1953.

Fibreglas Film Cases Ready

Film containers made of Fibreglas are scheduled for production this month by U. S. Fiberglass & Industrial Plastics, N. Y. City. The cases will weigh 5½ pounds, compared with 16 pounds for the metal containers now being used.



Finest Lenses Are Needed for New Projection Techniques...

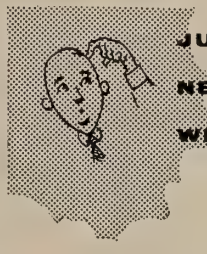
THE ANSWER

Cinema Raptars

THE WORLD'S ONLY PERFECTLY MATCHED PROJECTION LENSES

Today with the new movie techniques—CinemaScope, Vista-Vision, Wide Screen—exhibitors must have the finest basic lenses in order to give theatre goers sharp, clear pictures from edge to edge of the screen. There are no finer projection lenses made than Wollensak Cinema Raptars. (For CinemaScope these lenses are used with anamorphic lenses.) Cinema Raptars use six and seven element construction. Only with such a design is it possible to deliver full speed, edge-to-edge sharpness, and highest resolution. In addition, Cinema Raptars are the world's only perfectly matched lenses—focal lengths matched to within .0025! Marked as matched (twin) lenses. Speed ranges are f/1.9 in focal lengths from 2″ through 5″ and f/2.0 to f/2.7 in focal lengths to 7″ . . . priced from $180 each.

WRITE for new literature fully describing these new Projection Lenses. Wollensak Optical Co., Rochester 21. N. Y.



JUST PURCHASED NEW PROJECTION LENSES?

NEED ADJUSTMENTS FOR WIDE SCREEN?

WHAT TO DO WITH NON-ANAMORPHIC RELEASES?



Wollensak

VARI-FOCUS

a supplementary lens for all screen sizes

With the new Vari-Focus lens exhibitors can show all the current screen releases without buying a complete new range of short focus lenses. The Vari-Focus permits you to make adjustments for screen width . . . change the focal length of your standard projection lens quickly and easily. (See table.) The Vari-Focus is a supplementary lens which will produce any wide screen aspect ratio (non-anamorphic) when used in conjunction with a 3″ to 6″ projection lens. The resolution and picture quality will match those of the finest projection lens. Price $235 each.

Standard Lens	Variable Focus From
3″	2¼″ to 1¾″
3½″	2¾″ to 2″
4″	3¼″ to 2¼″
4½″	3½″ to 2½″
5″	4″ to 3″
5½″	4½″ to 3½″
6″	5″ to 3½″

WRITE for new literature fully describing this supplementary lens. Wollensak Optical Co., Rochester 21, N. Y.

MASTERPIECES of Optical Craftsmanship by **WOLLENSAK**

C'Scope Demonstrations

A series of trade and press demonstrations shortly of an important filmed "progress report" on CinemaScope and stereophonic sound will be held in every exchange city in the United States and Canada, 20th Century-Fox has announced. Demonstrations will be arranged so as to rotate five prints on a 5-city day-and-date basis covering all exchange areas within a period of 10-days.

Leading exhibitors, executives from production and distribution newspaper publishers and editors will be invited by the company to see the advances effected in the process in the past year. The subject, completion of which is scheduled for mid-June, will run for more than one hour and will be in color. Footage will be narrated and will point up such advances as new "taking" lenses perfected by Bausch & Lomb. The reel will also present a full comparison of 4-track magnetic stereophonic sound and regular optical sound.

Schedule Next TESMA Show

The next combined trade show of the Theatre Equipment and Supply Manufacturers Association, the Theatre Equipment Dealers Association and the Theatre Owners of America is scheduled to run from October 31 through November 3, 1954, at the Conrad Hilton Hotel, Chicago.

This next show will be extremely important, according to Walter Reade, Jr., president of the Theatre Owners of America. "The year 1954 is a 'year of decision' in the motion picture industry because the new developments in projection, sound and screens will come to a head and will govern our future investments and our future policies".

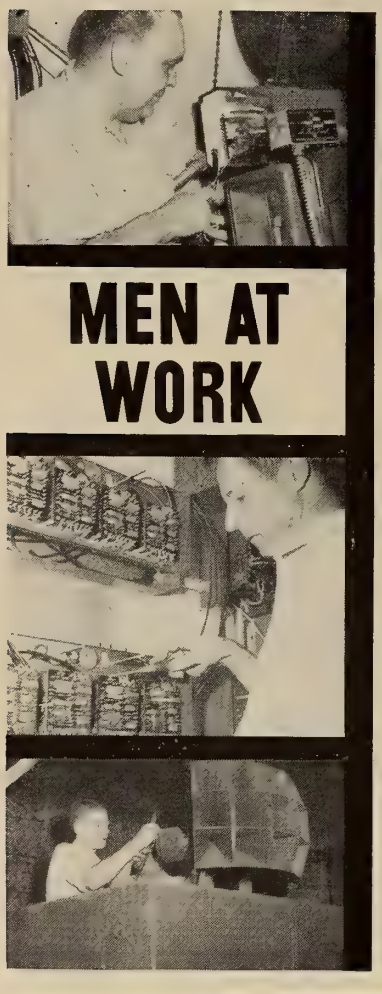
Film Equipment Exports in '53

Total exports of motion picture equipment, including cameras, projection and sound equipment, and studio equipment, were valued at $11,799,660, about 20% higher than 1952 exports valued at $9,826,921. Exports of motion picture cameras, sound recording and reproducing equipment, arc lamps, screens, and studio equipment registered increases in 1953, with the largest gains being exports of sound equipment and motion picture screens.

There was an increase in exports of motion picture projectors in all classes except 16-mm sound projectors: in 1953 such exports totaled 7,700 units valued at $2,572,821 compared with 10,092 units valued at $3,038,594 in 1952.

Fairchild Shipping Sound System

Shipments of Fairchild Perspecta stereophonic sound integrators have already been made to 15 countries. Fairchild is now in heavy production on the new stereophonic sound system which directs sound to three speaker channels from a single optical soundtrack. The integrator is the heart of the system.



Altec service men . . . 200 skilled, sound-wise field engineers . . . Altec-trained technicians equipped with Altec-designed precision tools and instruments . . . at work in theatres from coast to coast . . . installing stereophonic systems . . . servicing . . . repairing . . . replacing . . . counseling exhibitors . . . solving difficult problems . . . assuring perfect performance day in and day out . . . for 6,000 Altec-serviced theatres!

You can put an Altec service man to work for you tomorrow. Let us show you how . . . today!



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SERVICE CORPORATION

SPECIALISTS IN MOTION PICTURE SOUND
161 SIXTH AVENUE NEW YORK 13, N.Y.

Clayton Ball-Bearing Even Tension Take-Ups

For all Projectors and Sound Equipments

ALL TAKE-UPS WIND FILM ON 2, 4 AND 5 INCH HUB REELS.
SILENT CHAIN DRIVE

THE CLAYTON REWINDER

FOR PERFECT REWINDING ON 2000-FOOT REELS.

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Fred Waller Succumbs; Developer of Cinerama

Fred Waller, the man who brought on the new-process revolution in the motion picture business when he developed Cinerama, died last month at his home in Huntington, N. Y.

The 68-year-old inventor had been ill for some time and had been unable to go to Hollywood in March to accept an Academy Award for his development of the Cinerama process of "engulfing" the viewer and obtaining a 3-D effect by utilizing the full human angle of vision through projecting on a very wide screen curved almost to a half circle.

Inventions Numbered over 160

Waller preceded his motion picture discovery by more than 160 inventions in many fields, including a gunnery trainer used in this country and Britain during the second World War. Air Force officials once estimated that the gunnery invention, which was also an application of the Cinerama principle, prevented 350,000 casualties.

Born in Brooklyn, N. Y., Waller was attending Brooklyn Polytechnic Institute when he left school at the age of 14 and went to work in his father's photographic studio. He was connected with the motion picture industry for 40 years as a photographer, research technician and producer.

A fellow of the SMPTE, he also was affiliated with many other technical organizations, including the IA cameramen.

Vectograph Experiments

Work is now being carried on at the Technicolor laboratories on the West Coast to make possible the printing of full-color 3-D movies using the Vectograph material patented by the Polaroid Corp. If Vectograph is adapted to films, exhibitors will be able to show 3-D pictures on one projector without making any change or additions in their standard projection-room equipment.

Vectograph images are processed with polarizing dyes and therefore require no polarizing filters at the projection ports. The process makes it possible to print two images on the same film strip. Both images are full-frame; one is printed on the emulsion side and the other on the base side. The Vectograph process makes it possible for one oppositely polarized image to be projected through another. This has the added advantage of assuring perfect synchronization and alignment.

Movie Audience Is Changing

Regular customers, who formerly accounted for 52% of a theatre's business, today are responsible for less than 20%, and that situation cannot be corrected until Hollywood's total production is increased to 425 or 450 pictures a year, says Trueman T. Rembusch, former prexy of the National Allied exhibitor group.

Briefly, Rembusch's viewpoint is that frequent changes of bill and more pictures with strong box office pull are required to provide the momentum that will keep regular patrons coming back to the theatre.

Theatre Tv to Offer Opera

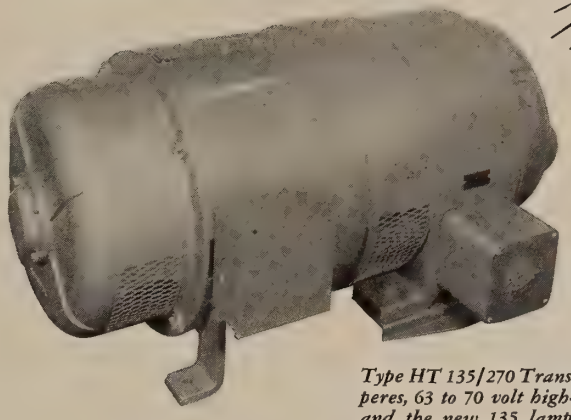
A deal between the Metropolitan Opera in New York City and Theatre Network Television, that will make an unusual opening night program of the Metropolitan available to theatres

...A NEW HERTNER POWER UNIT

for DRIVE-IN and LARGE INDOOR THEATERS

The HT 135 TransVerteR®

for 135 ampere ARCS



Type HT 135/270 TransVerter for 115 to 135 amperes, 63 to 70 volt high-intensity and spot arcs, and the new 135 lamps.

The *new* HT 135/270 TransVerter answers the need for 115 to 135 ampere arcs for all types of wide screen and 3D pictures requiring more light over a larger area. This latest Hertner TransVerter rounds out our line of dependable power units designed especially for arc lamps. Complete installation includes our Control Panel Type G and the new Dual-type HD 100/140 Rheostat.

For all the details of the many fine features of the new HT 135 TransVerter write for Bulletin No. 3018.

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In Canada: General Theatre Supply Company

Hertner

THE HERTNER ELECTRIC COMPANY
12690 ELMWOOD AVENUE . . . CLEVELAND 11, OHIO
A General Precision Equipment Corporation Subsidiary
MOTORS • MOTOR GENERATORS • GENERATOR SETS

THE ACE CUE MARKER

The World's Best

One push to left or right and all cues are made in 16- and 35-, Standard, Tv, or CinemaScope

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ACE ELECTRIC MFG. COMPANY
1458 Shakespeare Avenue
New York 52, N. Y.

throughout the country over theatre Tv, has been announced.

Instead of a single opera, a four-part program, "Great Moments from Great Operas," will be presented, including scenes from "Pagliacci," "La Boheme," "Aida" and "Barber of Seville." TNT has signed a three-year contract with the Met for the opening night telecasts, which will take in not only the opera but the audience, and the lobby festivities that usually mark the event.

RCA Stereo Sound Booklet

Stereoscope sound systems designed specifically for reproduction of four-track magnetic film are described in the new multi-colored folder issued by the Radio Corp. of America. The well illustrated text offers data on the magnetic head cluster, amplifiers, sound speakers, complete projector assemblies and the featured button-on soundhead with soft-loop film system. Form 2R8932 is available from the Engineering Products Div., Camden, N. J.

Canada Using Fewer U.S. Films

Figures on imports of films to Ontario, Canada, during 1953 show a drop in the number of American motion pictures brought into that province and a rise in the number of imports from other nations.

It was estimated that 437 American films were imported during a 1952-53 fiscal-year period, while only 401 were imported during the same period in 1953-54. A total of 59 pictures were imported from countries other than the U. S. in 1952, compared with a rise to 109 during 1953.

Video to Reach Australia

The Royal Commission, which has been studying Tv possibilities for Australia, recommended recently that it be inaugurated as soon as possible, with initial stations proposed for Sydney and Melbourne.

1A ELECTIONS

LOCAL 182, BOSTON, MASS.

Joseph Caplan, *pres.;* Frank Sullivan, *vice-pres.;* James Gibbons, *rec.-sec.;* Benjamin Bearman, *fin.-sec.;* Ralph Frazier, *bus. rep.;* Jack Rosenberg, *treas.;* Michael Keller, *trustee;* Morris Goldman, Frank Laby, Henry Gleken, *exec. board;* Alexander Tradd, Henry Perry, Fred Jones, Albert Goldman, Morris Myers, *sen. board;* Walter Diehl and Joseph Nuzzolo, Sr., *del. IA Convention.*

LOCAL 3, PITTSBURGH, PENNA.

Ralph Quinn, *pres.;* Vincent Coll, *vice pres.;* John Shelton, *sec.;* Julius I. Drobb, *treas.;* Philip J. Doyle, *bus. rep.;* Edward McGrath, *trustee,* and Raymond Steinecker, *sgt.-at-arms.*

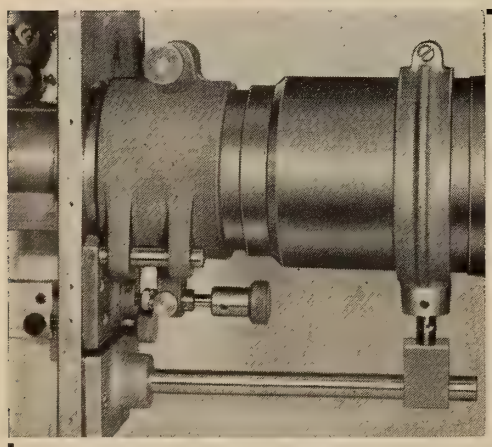
ARE YOU CONVERTING TO CINEMASCOPE?

SUPER LaVezzi SERVICE REG. U.S. PAT. OFF.



It will pay to investigate the possibilities of converting your present equipment—see your dealer or write for list of kits available for converting all models of Projectors and Sound Reproducers.

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LENS MOUNTS
Anamorphic and 4" Type

Wenzel Pro 50 and Pro 4,
Regular Rear Shutter Simplex,
Super Simplex and E-7 type Projectors,
Ballantyne "B" & "BW",
can be easily converted to use the 4" Projection Lens.

ALSO AVAILABLE:
Anamorphic Lens Supports, Large or Small, for all above mentioned Projectors and Century C & CC models.

Send for Illustrated Brochure.

WENZEL PROJECTOR CO. 2505-19 S. State St., Chicago 16, Ill.

AN UNCONDITIONAL GUARANTEE ★ from RAYTONE

The NEW HI-LUX SCREEN has reached a state of perfection that will meet the most *EXACTING PROJECTION* requirements

1 SEAMLESS CONSTRUCTION
2 UNIFORMITY OF SURFACE
3 SHARP DEFINITION
4 EVEN DISTRIBUTION TO ALL USEFUL ANGLES...
5 TEAR-PROOF CONSTRUCTION

★ *We back these claims with a money-back guarantee and you, Mr. Exhibitor, are the judge!*

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FISHER MANUFACTURING CO. 1 SALTER PL. ROCHESTER 13, N. Y.

ONE DOWN—MORE TO GO

(Continued from page 8)

Significant as were the technological developments during the past month, IP feels that further readjustment of distributor policy and technical standards is in the offing, but these will be forthcoming only if persistent pressure favoring such changes is applied.

Summing up, IP hails the switch in 20th-Fox policy so that thousands of additional theatres may play its badly needed product without going in hock for unnecessary equipment; it questions the necessity for stereophonic sound reproduction in the vast majority of theatres, even while it expects great improvement in the application of this medium, especially with respect to the acute need for intelligent control of volume in the theatre; it still disapproves of any aspect ratio higher than 2-to-1; it still is and will continue to be unalterably opposed to curved screens; it believes that the VistaVision process of an extended negative reduced to a positive frame of a sane aspect ratio that may be projected without the aid of claptrap "attachments" and with standard projection lenses still is the best bet for the exhibition field.

Overall, IP is not exultant anent the results stemming from its lone press battle against those policies which it considered inimical to the best interests of the exhibition field, in which sphere its readers move. On the contrary, it is a bit sad that these developments did not occur many months ago, as they could have, and thus spared the industry incalculable economic loss and, on the part of exhibitors, much personal grief.

The fight for technological sanity is far from won. The next, the inevitable step must of necessity be the establishment of technical standards which will enable the industry as a whole to go on and to preserve at the least its present economic status.



Photo of calibrated optical device which enables the projectionist to pre-focus a variety of lenses. As published on page 10 of the April, 1954 issue of IP, this device, designed by Joe Tritsch, of IA Local 150, Los Angeles, was shown in an inverted position. Here is the correct view. (Excuse it.)

Tv Color Quality Improved

A "color multiscanner," an electronic device designed to perfect the quality of television images transmitted from 16-mm color film, was demonstrated recently by DuMont Laboratories.

The device is said to achieve increased color brilliance over color Tv circuits by means of electronic masking system which allows the broadcasting studio to vary the saturation of colors as well as the brightness of the picture.

50 Drive-ins Get Stereosound

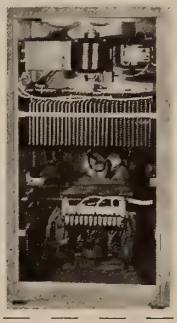
About 50 drive-ins in various parts of the country had been equipped with stereophonic sound as of last month, says 20th Century-Fox.

SELECTIFIERS

SELECT-A-VOLTAGE

SELENIUM RECTIFIERS

"Superior" & "50,000 Hour" types, 50 to 400 Amps, rugged, oversized, selenium stacks. Adjustable-in-use glass insulated transformers. Operate continuously in any climate, at standard or heavy overloads at maximum efficiency on both "Suprex" and H.I. Arcs. "Selectifiers" sell themselves on obvious quality and dependability.



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NORPAT, INC.
113 W. 42 St.
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"MOVIES ARE BETTER THAN EVER" WITH

SUPER-LITE HILUX



FILLS YOUR SCREEN

with the brightest clearest picture

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★ NEW ANASTIGMAT FORMULA
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★ NO CEMENT FAILURE—NO RECEMENTING
★ ALL AIR-GLASS SURFACES PRO-COATED
★ MINIMUM VIGNETTING
★ MAXIMUM SCREEN BRIGHTNESS

PROJECTION OPTICS COMPANY, INC.
330 LYELL AVENUE • ROCHESTER 6, NEW YORK

DISTRIBUTOR: RAYTONE SCREEN CORP.

ACE REEL-END ALARMS

The only ball-bearing reel-end alarms
Never fails—all sizes from 16" to 26"

Now $18.00

See your dealer or write to

ACE ELECTRIC MFG. COMPANY
1458 Shakespeare Avenue
New York 52, N. Y.

ANATOMY OF C'SCOPE

(Continued from page 13)

blessing to this tired old industry by reviving public interest in moviegoing. Continued success of the movies will not be due to either 3-D or CinemaScope, however, and certainly not the 20th's policy of whittling the number of releases to the vanishing point. Other major producing companies, notably Paramount, realize that the screens of small-town and neighborhood theatres must be supplied with pictures—*standard* pictures—if the industry is to survive. The absence of technological standards for the new processes is an industry disgrace.

Hollywood Exaggeration

With the exception of "The Robe," a phenomenally successful curiosity, CinemaScope grosses are no better than the "take" of the many really good normal pictures on the screens of American theatres. The secret of a successful motion picture industry is good pictures, not weird aspect-ratios.

So while we gather a bunch of posies to award to 20th for stirring up interest in movies, let us slip in a note of disapproval for unwarrented monkeying with film standards. There is no valid reason why CinemaScope should have been scaled to require an off-standard projector aperture or smaller perforations. There is little justification for using curved aluminum screens. That CinemaScope is itself distorted by screen-curvature is a small matter in comparison with the distortion of regular pictures shown on these screens.

Most exhibitors who have CinemaScope screens have no way of removing them for regular projection. As a result, conventional pictures, which have up to now been nearly perfect from the pictorial point of view, have been mishandled. In many theatres, the standard short subjects on CinemaScope programs have actually been projected with the oversized CinemaScope aperture. The writer has listened to many patron complaints on this score without asking for them.

Sloppy Technology

Worse still, exaggerated aspect-ratio apertures and excessively short-focus lenses are being used for projecting standard films on seamy, aluminized "wide screens." In fact, this wretched mode of presentation is actually being advertised by exhibitors as an attraction! Well, the public just isn't attracted by masked-off, distorted, seam-marred projection. One or two experiences with that sort of thing is quite enough.

So for the first time in the history of the business, small theatres in the neighborhoods actually have better projection than the superdreadnaughts. And people are beginning to "shop" for theatres where standard, undistorted projection of high quality prevails. The many excellent movies to be seen nowadays *are* being seen in the increasingly prosperous smaller theatres.

The standard 3:4 format *on a sufficiently large screen* which is flat and which is white is still the preferred manner of presenting motion pictures. While CinemaScope is indeed a Godsend for the producers of "spectacles" and travelogues, the more subtle and adult emotional dramas just can't get across the width of the wide screen.

[THE END]

MONTHLY CHAT

(Continued from page 5)

from the sprocket hole areas and wider magnetic film coatings are employed."

The magnetic filings on the film are nothing but emery, which if introduced into the motion picture reproduction process only a few years ago would warrant the opprobrium of both engineering and exhibitor circles. Today, however, with magnetic stripings the vogue, it seems that Messrs. Engineer and Exhibitor beam upon the projectionist for introducing this substance which is utterly foreign to the satisfactory operation of a precise mechanism.

We have seen emery introduced into a gear train for the sole purpose of discrediting the premiere performance of a new soundhead in a Broadway theatre; but we never expected to see the day when the deposition of this substance over the entire projector mechanism (ignoring for the moment the factor of head wear) would be acclaimed as a significant engineering advance.

So far as IP is concerned, we state that sound reproduction *via* the single optical track, plus an integrator which shunts the sound to a multiple-horn installation, is wholly acceptable to the average auditor. In fact, it is a higher quality sound than is available from even the finest radio or Tv set now on the market. When people talk about "high-fidelity" sound, we always pose this question: "In what manner is the sound recorded, and what is the cut-off frequency?" The solution to many of our present difficulties may be readily resolved by an honest answer to this query.

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VOLUME 29 • NUMBER 7

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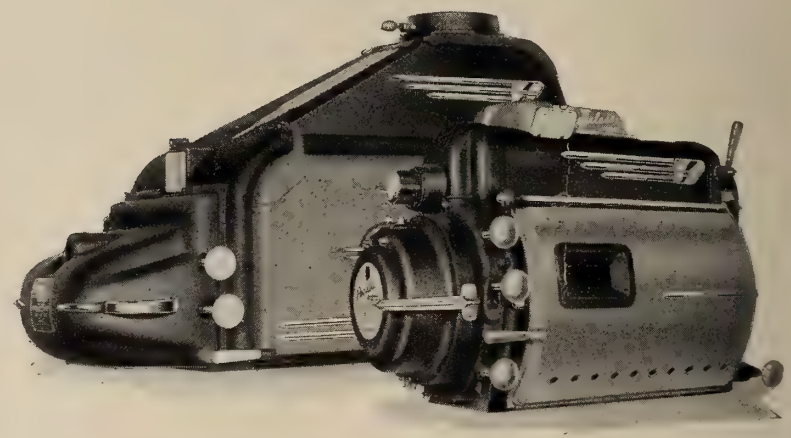
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MONTHLY CHAT

IT IS NOW more than 60 years since a farsighted group of theatrical workers founded the labor union that grew into the great International Alliance of Theatrical Stage Employes and Moving Picture Machine Operators of the United States and Canada. In a little more than half a century this organization has risen from humble beginnings into a brotherhood which joins together the complicated technical skills that make the modern entertainment industry possible.

Those who handle film, who photograph dramas, comedies or news on such film; those who direct photography; those who handle the operations of studios; those who record sound; those who handle film in the exchange; those who project it, and those who service equipment are among the wide variety of theatrical employees who belong to the IA. They are now being joined in larger and larger numbers by skilled workers from the field of television and the allied arts.

At almost every moment from the time that the idea for a motion picture or a "live" theatre entertainment is conceived to the moment when it is presented to an audience, the IA worker plays a vital part.

Great technical skill and wide experience is required to carry out the diverse assignments which IA men undertake. And as the fields of video and audio entertainment develop apace, it is to be expected that IA members will increasingly fit themselves by study and experimentation to carry out their part in the further development of such fields. Television broadcasting is an industry destined to be an ever-increasing agency of public instruction and entertainment.

IA members now have at the same time a great opportunity and a great responsibility to learn all about their field of endeavor, to keep up to date and to foresee the future and be prepared for it. It is their opportunity to be indispensable workers and leaders in the existing and new fields. And it is their opportunity to make the public feel, concerning the IA membership, that never have so many people owed so much entertainment and so many interesting hours to such an unsung group of skilled workers.

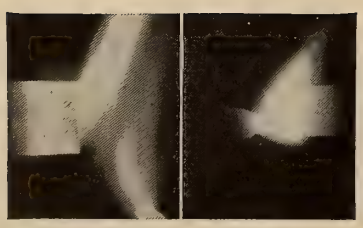
Secure in the knowledge of the valuable services they perform, the men of the IA who gather now for their 42nd convention look into the future with confidence because they know that their skill and the valuable experience they have acquired is recognized and respected by everyone in the entertainment world.

The foregoing is in itself not only sufficient justification but actually a mandate for the publication of the Special IA Convention section of this regular monthly issue of IP.



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INTERNATIONAL PROJECTIONIST

VOLUME XXIX JULY 1954 NUMBER 7

Evolution of the Modern Projection Lens

A detailed but easily understood explanation of the origin and development of the highly-corrected, six-element lens now used in projection is given. Problems that have confronted designers of lenses, and the methods employed in solving them are described herein.

By ROBERT A. MITCHELL

NOT until the eleventh century —the era of the Magna Carta and Genghis Khan—were lenses of a simple type readily obtainable. In the Thirteenth Century lenses were used as spectacles, one of their first practical applications. But if the early European spectacle-makers thought their invention very modern, it was because they didn't know what had been going on in China since ancient times. Nevertheless, even the Chinese had to go without bifocals until Ben Franklin invented them.

On the scientific side, lenses were brought together to make a microscope in 1590 (Janssen) and a telescope in 1609 (Galileo). Not many years later the image-forming properties of lenses became better known, and the "magic lantern" was devised. The invention of this picture-projecting apparatus is usually credited to Anathasius Kircher, who made one having both condensing and projection lenses in 1671.

Kircher's "Magic Lantern"

It's a far cry from Kircher's magic lantern to the modern motion picture projector fitted out for stereophonic sound and CinemaScope. But Kircher's lantern and hand-painted slides of angels in nightshirts *did* start the ball rolling; and when practical photography came into being (about 100 years ago), the magic lantern assumed the dignified name of "stereopticon" and was used as an instrument of show business.

Motiograph, Inc., now occupied with the manufacture of the very latest projection, sound, and theatre-Tv equipment, began its long and continuous career in 1896 when it made an "entertainment outfit" consisting of a magic lantern, several sets of slides, and a supply of advertising posters and admission tickets!

The Single-Element Lens

At this point let's direct attention to the little disks of curved glass that made this primitive kind of show business possible—the lenses which project pictures on the screen in highly magnified form.

A simple magnifying lens can be bought at almost any dime-store for a few cents. Such a lens, comprising only one circular piece of glass having bulging (convex) sides, is called a *positive* lens. Positive lenses have the power to converge rays of light to a focus, and thus are able to form an image on the film of a camera or the screen of a movie theatre.

A motion picture can thus be projected with a dime-store magnifying glass, but the screen image so obtained will win no "Oscars" for quality! For clearer pictures on the screen we must use a better, more expensive lens.

When astronomical telescopes first came into use, simple single-element lenses resembling dime-store magnifying glasses were employed to form the images of distant objects. The images of the sun and moon, and the planets and stars definitely lacked image-quality. One of the most serious things the matter with them was the presence of rainbow-colored fringes at the edges of every object. This defect is known as "chromatic aberration."

Isaac Newton's Error

Sir Isaac Newton was a great scientist, but like the rest of us he pulled "boners" occasionally. A famous one was his belief that chromatic aberration was utterly incurable. Feeling certain that nothing could be done to get rid of the blurry colored fringes, he devoted his attention to reflecting telescopes which, having

mirrors instead of lenses, were free from chromatic aberration.

About 30 years after Newton's death, however, a startling discovery made by John Dollond revived interest in refracting, or lens-type telescopes. If a plano-concave lens of flint glass be placed in conjunction with a bi-convex lens of crown glass, Dollond demonstrated, the different dispersion characteristics of the two kinds of glass would almost wholly neutralize chromatic aberration.

And thus in 1758 the *achromatic doublet* was born, and the history of scientific lens-making began. From that time on, optical designing became a specialized art, and lens manufacturers began the quest for new and better optical glasses for lens-making.

The next great revolution in the optical art came about in 1886 when the Jena Glass Works of Germany announced the discovery of 19 new types of glass for lenses. This was followed by 24 other new glasses in 1888 and 8 more in 1892. Modern projection lenses are made possible by the heavy barium-crown glasses discovered at Jena.

The Color-Corrected Lens

Now, then, we may discard our dime-store magnifier and try a Dollond achromat—two single lenses of crown and flint cemented together with resin—in a motion-picture projector. A very great improvement will be noticed, and yet the screen image still leaves much to be desired. Even though free from color-blurring, the simple achromat is afflicted with spherical aberration, field-curvature, coma, and other distortions such as "astigmatism."

Spherical aberration is caused by the outer zones of the lens having a slightly shorter focal length than the central regions. This aberration produces a "soft-focus" effect by covering bright objects in the image with a luminous haze.

Field-curvature is present when either the middle or the edge-areas of the projected image can be focused sharply, but not both areas at the same time. A lens afflicted with field-curvature is unable to give the flat field desired in projection lenses.

Coma is a stubborn blurriness of the edge-areas of the projected picture. This defect is easily distinguished from field-curvature, for coma makes it impossible to obtain a sharp focus in the edge-areas.

Astigmatism is a peculiar distortion of the configuration of image-points. It is best illustrated by the image of a spoked wheel. When astigmatism is present, one focus-position of the lens will produce sharp images of the spokes (radial lines) but not of the circular hub and rim. When the lens is refocused to image the hub and rim clearly, the spokes go out of focus.

Some Lens-Design Problems

Some of these exasperating aberrations could be eliminated by proper designing of our simple achromatic lens. By "figuring" the lens surfaces to special curves difficult to obtain in practice, spherical aberration could be removed. By "bending" the lens to a meniscus, or crescent form, a few of the other aberrations could be eliminated. While the forms of lenses are frequently "bent" in commercial lens-manufacture, only spherical curvatures are practicable.

It is obvious that we shall have to find a better lens than a simple achromat in order to obtain a clearer, crisper picture on the screen. And a satisfactory projection lens, when we find it, will be a *compound lens* consisting of two or more lens-elements mounted in a tube, or lens-barrel. Moreover, the lens should be large enough to intercept and send to the screen all, or nearly all, of the light that passes through the film-photograph in the aperture. We therefore require a "fast" lens, and since accurate lenses of large diameter are difficult to manufacture, we must expect a really satisfactory projection lens to cost several hundred dollars.

The Petzval Design

Lenses suitable for projection did not exist before 1840. That was the year that Joseph Petzval, an Austrian scientist, designed the first practical compound lens for photography and projection—big and fast and free from most of the troublesome aberrations of simple lenses.

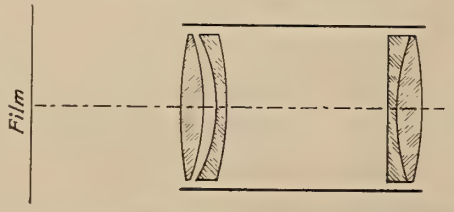


FIG. 1. The Petzval aplanat is the most commonly used projection lens. Its chief failing is its small angular field of good definition, making it unsuitable for short-focus lenses, which must cover a wide field.

The "Petzval doublet," or *aplanat*, as this lens is called, is shown in cross-section in Fig. 1. Doesn't it look familiar? If the lenses in *your* projectors are not of the very latest type, they are undoubtedly Petzval aplanats. As a matter of fact, this type of lens has been the standard for motion picture projection ever since the Lumiere brothers first turned the crank of their Cinematographe in the autumn of 1894. Better types of projection lenses did not appear until about 15 years ago.

In most makes of projection aplanats, the two lenses of the front element are cemented together with Canada balsam (the refined pitch of the fir tree) or with synthetic resin, but the two lenses of the rear element (nearest the film) are usually separated by a small air-space.

Among the most widely used makes of Petzvals we find the Zeiss Kinostar and Kipronar, the Busch Neokino, the older Ross, and the older Kollmorgen Snaplite and Bausch & Lomb Cinephor.

There are, of course, many minor variations in the design and construction of these different lenses. For this reason they vary widely in quality.

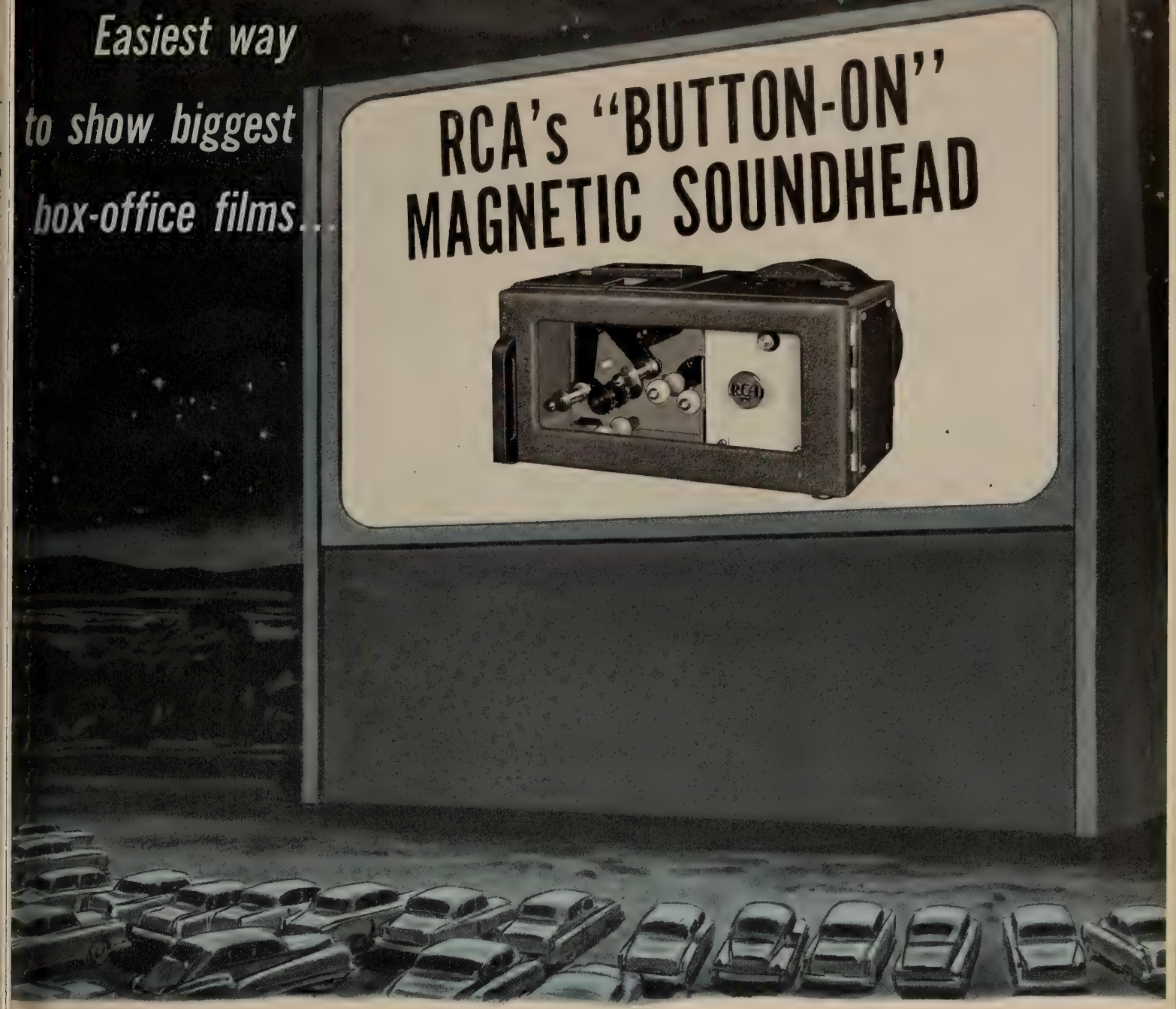
Limitations of Petzval Type

Now, even though a well-designed, well-made Petzval performs very well indeed, it has a serious shortcoming that shows up in the shorter focal lengths—particularly when the E.F. (equivalent focus) is shorter than 4 inches. The angular field which Petzval aplanats cover with good image-definition is only from 12 to 15 degrees. Outside of this small area of good definition the image suffers from coma (unfocusable blur) and heavy field-curvature.

Extremely sharp focus in the edge-areas of the picture is therefore practically impossible with an aplanatic lens having a focal length shorter than about 4½ inches. But with focal lengths of 4½ inches and longer, the aplanat has the advantage of extremely sharp definition even when the lens has a very large diameter.

In 1890 two German scientists, Abbe and Schotte, widened the angular field with a new type of lens construction called the *anastigmat.*

(Continued on page 18)



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Maintenance of Sound Quality With Magnetic Pickup Heads

By EDWARD STANKO

Manager, Engineering Section, RCA Service Co.

ONE of the most important units of four-track stereophonic sound reproducing systems is the magnetic pick-up cluster. This unit is the heart of the system and corresponds to the optical lens and phototube of a standard 35-mm sound reproducing system. There is, however, one main difference between the two pick-up systems in that the surfaces of the magnetic pickup head are subject to wear from the oxide on the soundtracks.

Various methods of reducing the wear of the pickup surfaces have been used. Probably the best method used so far has been the use of a "soft loop" such as has been incorporated in the RCA soundhead. This reduces the friction between the pickup head surfaces and the soundtrack oxide so that minimum wear occurs.

Firm Contact Imperative

For good sound reproduction, all of the magnetic tracks should make a firm contact with the pickup head surfaces. In some instances, one or more of the pickup surfaces wears more than the others, causing a dropping off in sound level. If the pickup surfaces have worn down unevenly, and there is still sufficient metal left, it may be possible to have the surfaces relapped at the factory. Before this is done, the projectionist should consult with his service engineer to see if such a procedure is advisable.

Occasionally, foreign substances become deposited on the magnetic pickup head surfaces. Cleaning the surfaces is minor, but very important, routine procedure for the projectionist. Some heads can be cleaned with ordinary carbon tetrachloride, while others should be cleaned with alcohol, depending upon the kind of potting compound that has been poured around the cluster coils.

To be on the safe side, ask your service engineer for the proper type of cleaning fluid to be used on a particular pickup head.

Occasionally, also, some of the metal parts comprising the pickup become magnetized. Where this has occurred, it is necessary to demagnetize the parts to obtain satisfactory performance. This procedure can be carried out as described in a special article on degaussing which appeared in the March 1954 issue of IP. *

'Grounded' or Open Coil

If all of the amplifier channels are operating normally and severe hum is being picked up on only one of the channels, the trouble will usually be caused by a grounded or open pickup coil. Because the entire pickup coil cluster is usually enclosed and potted, the quickest way of correcting this condition is to replace the entire assembly.

If difficulty has been experienced with the quality of sound reproduction, a careful inspection should be made to see that the film is properly contacting the pickup head surfaces. Sometimes the head surfaces wear down so that the film rides on one or more of the shield separators that are placed between the pickup sections. If one of these separators, or the potting compound between the clusters, is higher than the surface of the pickup head, it will prevent the film from contacting the pickup surface, causing loss of sound level and possible distortion.

When the pickup surfaces have been worn down to a point where the surfaces are practically flat and there is insufficient metal left for relapping, the entire cluster must be replaced.

It would be a happy circumstance if sufficient questions anent the operation and maintenance of magnetic sound reproducing heads could be obtained from projectionists to provide the basis for a symposium thereon.

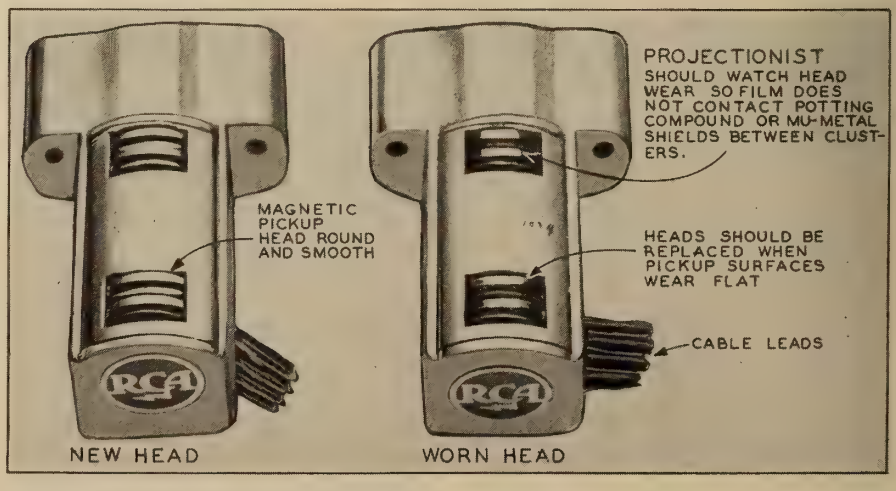
[ED.'S NOTE: IP enthusiastically approves of the suggestion advanced in the paragraph immediately preceding and would open its columns wide therefor, irrespective of space demands.]

* "Simple 'Degaussing' Procedure Protects Magnetic Tracks," by Edward Stanko, p. 10.

McKenna Upped to RCA Top Theatre Post

George L. McKenna has been appointed Manager of the Theatre and Industrial Marketing Department, Engineering Products Division, of RCA. He succeeds Barton Kreuzer, who has been advanced to Director of Product Planning.

Mr. McKenna, who joined RCA in 1945, has served for the past year as Manager of Operations Planning for the division. Previously, he was special assistant to the vice-president and general manager, and was sales manager of industrial products. As marketing manager for RCA theatre and industrial equipment, he will be responsible for the product planning, marketing, and sales of RCA theatre products, industrial and scientific instruments, sound and visual equipment, film recording apparatus, "Tv Eye" closed-circuit systems, tape recorders, and "hi-fi" sound components.



Graphic representations of new and old magnetic reproducer heads, directing projectionist attention to vital points of wear thereon.

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New Light On The Past

By FREDERICK GOOCH
Member since 1913 of IA Local 224, Washington, D. C.

During a recent round-table gab-fest (inevitable when projectionists gather) there arose a question relative to the series of articles "Heart of a Projector Mechanism," which Robert A. Mitchell contributed to IP for July, August, and September, 1952. These discussions induced the appended commentary. This is of historical import because it is first publication anywhere of the correspondence between Thomas E. Edison and Thomas Armat. Significantly, both Messrs. Edison and Armat are on the Honor Roll of the SMPTE for their vital contributions to the development of motion pictures.

I ENJOYED reading Robert A. Mitchell's article, "Heart of the Projector Mechanism," printed in the July, August and September issues of IP for 1952. However, I take issue with him on several points.

For many years I had known C. F. Jenkins and Thomas Armat, and had often discussed patents and mechanisms with either of them at separate times. To this writer, C. F. Jenkins was a brilliant man but he could never seem to get out of the experimental stage. He never got away from applying the beater-movement to motion pictures. This movement was not of any use for projection purposes.

Still, in 1909 he designed a 35-mm camera with this same beater-movement. Several years later he designed a projector called the "Graphascope," which had the Geneva movement, a very poorly designed machine, which had no commercial success. I presented one of these projectors to the Smithsonian Institute, along with several others to be used for exhibition purposes. In no way, please understand, am I trying to belittle Mr. Jenkins. I valued his friendship.

Armat's Ideas Adopted

Thomas A. Edison was another experimenter who never produced a practical projector until Thomas Armat came on the scene. Edison then admitted defeat and dropped all of his experiments and adopted Armat's methods. For proof of this statement see the accompanying photo of a letter sent by Edison to Armat. When Mr. Armat gave me this photographed letter it was promised that I was never to show it as long as he lived. I don't know of anyone else having a copy of this photo, and I think it should be published.

In February, 1937 Local 224 (Washington, D. C.) of which I am and have been a member since 1913, held an anniversary banquet. Our committee contacted Mr. Armat, asking for a brief history of his participation in the early days of motion pictures. His reply was as follows;

Washington Showing in 1895

"Responding to your request for a brief statement of my part in the invention and development of the first successful moving picture projecting machine, the first exhibition of moving pictures on a screen that embodied any of the features of present-day movies was given by me in my office at 1313 F Street, Washington, in August, 1895. This machine was the result of several months of experimental work directed and financed by me.

"Associated with me in the production of this machine during these months was the late C. F. Jenkins, and on August 28 we applied for the joint patent on the machine which later issued as U. S. Patent No. 586,953.

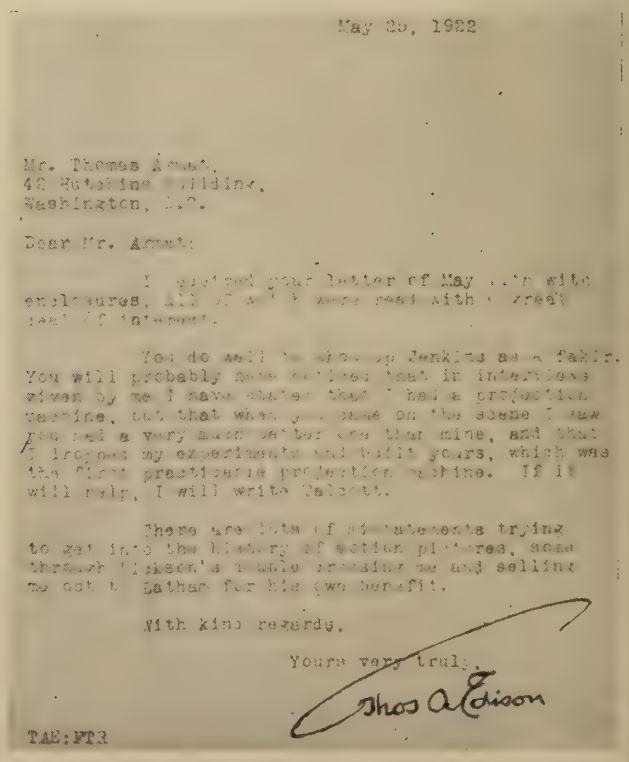
"This patent covered the feature of making the period of illumination of each picture exceed the period of obstruction, or shift, but the intermittent mechanism for accomplishing this was a complete and incurable failure and the machine was abandoned after a few exhibitions in my office.

The First Practical Projector?

"Shortly after this I developed a practical machine with an entirely different intermittent mechanism and other improvements, including the important one of providing a pre-determined amount of slack in the film. This machine I christened the "Vitascope", and is shown in my patent No. 673,992 filed on February 19, 1896.

With this machine I gave the first motion picture exhibition ever given in a theatre, in Koster and Bial's Music Hall, New York in April, 1896.

"Subsequent to this I developed a



May 20, 1922

Mr. Thomas Armat,
42 Hotaling Building,
Washington, D.C.

Dear Mr. Armat:

I received your letter of May 17th with enclosures, all of which were read with great deal of interest.

You do well to show up Jenkins as a faker. You will probably have to let him have that in interference given by me I have stated that I had a projecting machine, but that when you came on the scene I saw you had a very much better one than mine, and that I proposed my experiments and tests yours, which was the first practicable projection machine. If it will help, I will write Dalcott.

There are lots of misstatements trying to get into the history of motion pictures, some through Jenkins's unscrupulous and selling me out to Gather for his own benefit.

With kind regards,

Yours very truly,

Thos A Edison

TAE:FTR

This letter from Thomas A. Edison to Thomas Armat is the first reproduction ever published and as such is of historical import. The statements in this letter, over Edison's signature, go far to refute the long-standing opinion of motion picture people as to Edison's contribution to the motion picture projection art.

still different, and a much better, intermittent mechanism, which gave the film gradually accelerated stop-and-start movement that reduced the wear on the film and the vibration of the picture on the screen.

Patents on File

"Application for patent covering this mechanism, known as the star-wheel intermittent was filed on September 25, 1896, and later was issued as Patent No. 578,185. The mechanism of this intermittent was immediately adopted to the exclusion of practically all others in the early days, and is still the preferred intermittent for use in theatres, so I am told.

"All of these patents, are, of course, matters of record in the U. S. Patent Office where copies may be obtained. It may interest you to know that I never sold or authorized the sale of a machine, relying instead upon royalties as a source of profit on my inventions.

Patent Delays, Litigation

"Delays in the issue of patents and subsequent litigation resulted in the manufacture and sale of a flood of unauthorized machines, all of them infringing one or more of my patents and most of them infringing all of them. I helped to organize the Motion Picture Patents Co., composed of the Edison, the Biograph, and my own company.

"These royalties, while small individually and easily met by the industry, amounted in aggregate to a very substantial and satisfactory net income."

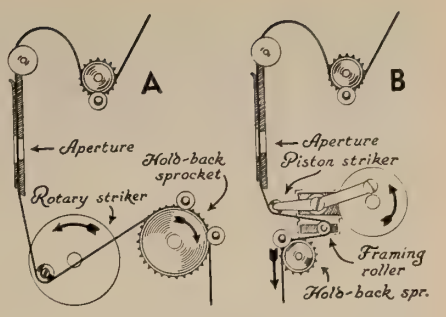


FIG. 1. The striker movement—it struck many a nickel into the coffers of the old-time nickelodeon. Rough on film and on the eyes of the audience, both the "dog" striker in A and the "piston" beater in B jiggled many a celluloid romance to its happy conclusion. The pull-down sprockets revolved at constant speed.

To Which Mr. Mitchell Replies:

On what points does Frederick Gooch take issue with me? After careful study of the interesting material submitted by Mr. Gooch, I am unable to discover any serious disagreement with the brief historical resume given in my article "Heart of the Projector Mechanism" in IP for August 1952, page 8.

Perhaps I may be criticized for failing to mention that Edison's projection Kinetoscope was basically the third Armat machine.

Armat, Lumiere Showings

Also, I did not mention Thomas Armat's exhibition of Edison films on a screen in his office in August 1895. Neither did I mention the private projections of movies with the Lumiere Cinematographe early in the autumn of 1894. Of the two showings, the Lumiere exhibition must surely be considered the more important, since they made their own films, and their screen results were far superior to Armat's.

In view of the Lumiere brothers' precedence in the field, I should take issue with Armat's statement that his August 1895 showing was "the first exhibition of moving pictures on a screen that embodied any of the features of present-day movies." It cannot even be argued that Armat's first projector (built in collaboration with Francis Jenkins) had an intermittent movement similar to the Geneva movements of the present time. His first machine had a Geneva-type movement, but the star-wheel had 14 slots! The large mass of this star-wheel, combined with that of the 56-tooth intermittent sprocket, prevented smooth, rock-steady operation.

Lumiere Claw Movement

The simple claw movement of the Lumiere Cinematographe camera-projector (still used in many professional motion-picture cameras) functioned perfectly.

Armat himself admits that his first Geneva-type intermittent movement "was a complete and incurable failure; and the machine was abandoned after a few exhibitions in my office." The familiar Geneva intermittent having a star-wheel with 4 slots was first used in a projector built by O. Messter in 1896.

The Kinetoscope

The name Kinetoscope was first applied by Thomas Edison to his peep-hole moving-picture machine which exhibited the 48-frames-per-second films photographed by his Kinetograph camera. To Edison goes the undisputed honor of having invented the motion-picture camera and the 35-mm film designed with 4 perforations per frame on each side.

With the exception of the speed of the film, Edison's film-standards are still in use, and probably always will be for professional movies, notwithstanding Todd A-O and other wide-film processes. Most exhibitors have already turned thumbs down on off-standard film-widths.

It was not until Edison had met Armat and made a deal to manufacture Armat's Vitascope projector was the name "Kinetoscope" applied to anything but the great inventor's lucrative peep-show machine.

From 1894 to 1897 Edison did everything possible to discourage the building and use of motion-picture projectors. At first the great inventor claimed that the projection of moving pictures was impractical. Perhaps he actually believed that, just as, later, even when the principle of the vacuum-tube lay within his grasp, he declared radio to be unfeasible if not utterly impossible.

It must be kept in mind, however, that the Wizard of Menlo Park was no slouch in matters of quick dough. His peep-show concessions were bringing in floods of nickels. Why plug the profitable peep-hole by *projecting* the pictures?

Motion Picture Patents Co.

Edison's frequent threats to sue everyone who as much as thought of projecting motion pictures (especially if they had it in mind to project Kinetograph films) gained volume, if not force, by the appearance of Thomas Armat and his sale to Edison of the rights to his second projector. The sound and fury of impending litigations were not entirely quelled, even if ignored by the courts, until the demise of the old Edison-Biograph-Armat equipment monopoly known as the Motion Picture Patents Co. Meantime, internecine strife at the Edison

(Continued on page 25)

LETTERS TO THE EDITOR

Ingenuity in the Antipodes

To the Editor of IP:

I was particularly interested in the question posed by Lawrence Johnson, of the Aggie Theatre, Stillwater, Okla., in a recent "What's Your Problem" column of IP (March 1954). I had similar trouble using 1-kilowatt lamps, although they were not connected to the theatre ventilating system.

Noting the British Arcvent featured in IP some time ago (March 1954), I made inquiries but found that this unit was not available in this country (Australia). I then discovered that war surplus disposal stores were selling an ideal substitute — a blower unit taking 26 volts D.C. at 1½ amps used originally for cooling transmitter power tubes, and priced at 3 pounds, 10 shillings (approx. $9).

It had mounting brackets ready for use on top of the lamphouse. I wired it (fused) to the arclamp circuit so that it functioned when the arc switch was closed to bring the arc into operation. This method has been quite satisfactory, the units now having been in use for a year, doing a good job. Similar units must be available at war disposal stores in the U.S.A. and other countries.

Your publication is "tops" with us, and we are grateful for the candid and honest comments on the latest trends. Although every industry must progress, the lack of standardization is very unwise indeed.

REGINALD A. STEWART
Plaza Theatre, Wangaratta,
Victoria, Australia

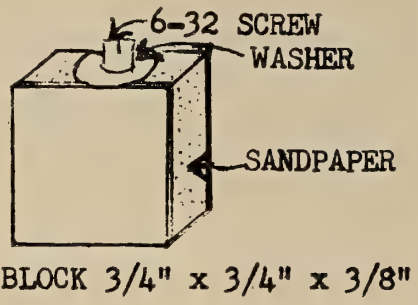
Film Scraping Sandpaper Block

Letters to the Editor:

Anent R. J. Fisher's letter in IP for May (p. 23) where he describes the wooden sandpaper block for scraping film in preparation for splicing. I have used for some little time a sandpaper block which I think is superior to the Fisher unit, as the sandpaper is replaceable without the use of glue.

The accompanying drawing shows its construction: it is made of aluminum ¾ x ¾ x ⅜ inch thick. On one of its edges a hole is drilled and tapped for a 6-32 machine screw. A strip of sandpaper just the width of the block is wrapped around the edges, with the end extending under the washer as shown. When the screw is tightened, the sandpaper will stay in place without glue, thus making it very easy to replace the abrasive when it is worn.

The abrasive on three edges of the block is usable, with each edge being wide enough to give two cutting surfaces, making six surfaces to be used prior to replacement. I recommend a fine grade of waterproof sandpaper, being much superior in cutting quality and lasting much longer.



Diagrammatic representation of Jackson CinemaScope film scraper.

Any projectionist can make this unit if they find a bit of the right aluminum of the right dimensions. For those who cannot make their own, I will gladly send them one *free of charge*. Simply drop me a line requesting one, *but* enclose ten or fifteen cents to cover mailing cost. Being the manufacturer of Jackson Reel End Signals, thus have a goodly supply of aluminum on hand.

I haven't yet been confronted with splicing CinemaScope film, but I heartily endorse the comments made by Mr. Fisher.

J. G. JACKSON
8 Mar St., Port Alberni, B. C., Canada

What's Your Problem?

QUESTION. *Here's a problem in 3-D projection that I do not believe has received sufficient attention. I have found that, for maximum effectiveness, projector port filters should be adjusted in a manner that guarantees that the reflected light from the screen is properly polarized. It is not enough to level the filter mounts then—and trust to luck.*

Is the following right or wrong? I suspect that steep projection angles cause the reflected light from the screen to have a changed polarity from that of the incident light. To establish this for yourself level your projection filters, start either machine, and throw a reduced light on the screen. While the machine is running, go over and look through the other leveled filter toward the screen and notice that the reflected light is not blacked out. Loosen the filter you are looking through, and you will be able to blackout the light by rotating it somewhat. You will then notice that the filter is not level with the other. For this test use only enough light to ascertain blackout point and have the filter cooling blower in operation.

It is also true that there are slight manufacturing errors in some filters so that the lines of polarization are not always at the proper angle to the mounting frame; result: the filters cannot be accurately positioned merely by leveling the frames with a spirit level.

EARL W. ANDERSON
Hill Theatre, Hillsboro, Oregon

ANSWER. According to John A. Norling, pioneer in the development of stereoscopic motion pictures, you are incorrect in suspecting that there is a noticeable change in the lines of polarization of reflected light when the projection beam strikes the screen at a sharp angle. It is more probable that the light you noticed passing through the filter, when there should have been a complete blackout, got through as a result of a defect in the filters, as you noted in your letter.

Not every pair of filters is so efficient as to adequately control the light striking them, and not all are mounted so accurately that the lines of polarization will be at right angles when the filters are leveled. Mr. Norling states that a 5% deviation will cause ghosting.

New Altec Lansing Speakers

Altec Lansing Corp. is now offering two newly-designed models of its "Voice of the Theatre" loudspeaker units, bringing the total number of models to nine. These new loudspeaker systems, coded A-6 and A-7, replace the Model 800 previously made for small theatres.

There is a two-fold reason for the development of these new systems, according to Altec: the higher requirements of stereophonic sound reproduction and the increased need for lower-priced sound systems in smaller theatres. The new design is said to provide not only extended bass and high-frequency reproduction but a smoother overall frequency response. The A-7 is priced at $260; the A-6 at $425.

30,000,000 Tv sets Operating

The number of Tv sets installed in the U. S. has passed the 30,000,000 mark, according to the research department of National Broadcasting Co., an increase of 6,000,000 over May 1 of last year.

New Westrex Sound Reproducing Equipment

THE Westrex Corp. complete new line of theatre sound reproducing equipment is designed to meet the present demand for higher-fidelity sound. The new systems include both multi-channel models, either for magnetic or optical reproduction. Among the featured components of the new systems are:

The Westrex R9 stereophonic reproducer, operable on any modern projector to reproduce magnetic sound tracks, has a very low mechanical flutter content, made possible by its hydro-flutter suppressor, which won an Academy Award, plus a tight film loop and double flywheels.

In theatres already equipped for multi-channel magnetic sound, an additional unit, the Perspecta sound integrator, is available for stereophonic reproduction from a single optical track. The integrator senses control frequencies recorded on the track below the level of audibility, and moves the apparent source of sound back and forth across the screen by varying the volume to the three speakers. The integrator is connected between the soundhead and the power amplifier.

Noteworthy New Features

The Westrex R7 photographic sound reproducer features for the first time special timing belts, used in all high-quality studio recording systems, which do not slip or stretch and are noiseless. The R7 has a longer optical path and the "Equilight Diffuser." The latter is a special part of the Westrex lens system which spreads the light equally over all the sensitive surface of the photo-electric cell and provides a minimum of distortion from variable area recording and the best possible response from any type of recording. All shafts are mounted on ball bearings.



Westrex sound systems 36 and 37 amplifiers cabinets (front view) provide up to four channels for magnetic or photographs reproduction. The full-length rear doors and removable front panels are featured servicing aids.

The T454 power amplifier, with a new circuit and specially wound coils delivers more output with less distortion and using less current from standard vacuum tubes than any previous 50-watt amplifier.

Westrex T604A pre-amplifiers are designed to provide the higher gain and greater quietness required in pre-amplifiers reproducing magnetic sound. The Westrex 33 cabinet assembly includes a muting amplifier for auditorium speaker control, in addition to four magnetic pre-amplifiers.

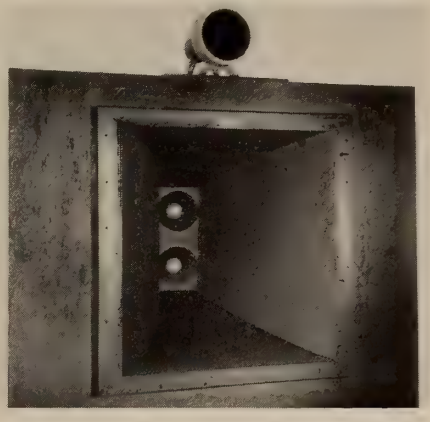
Unique Switching Facilities

The Westrex 36 and 37 cabinets, six feet high, provide for 3 or 4-channel magnetic and switching facilities. These unique facilities make it possible to reproduce through three speakers or, if one channel fails, through the other two channels; or, if desired, through one channel. The C36 cabinet also provides a volume indicator which can be switched to any of the channels to assure proper balance between channels. Servicing is done from in front of the cabinet; space is provided for possible future additions.

Completely redesigned for increased efficiency under the exacting requirements of multi-channel sound are the new Westrex high- and low-frequency speaker units and associated baffles.

An outstanding feature of the new Westrex speaker equipment is the replacement of the multi-cellular horn formerly used in connection with high-frequency units by the Westrex "acoustic lens," which assures an even distribution of sound throughout an auditorium and an absolute minimum of interference pattern. The principle of this lens has its roots in the need for *uniform* distribution of high frequencies over the required angle of auditorium coverage.

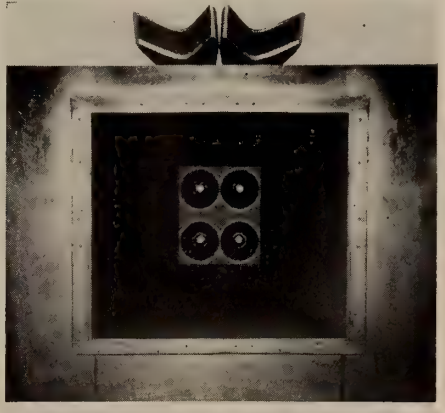
This involves the use of a type of structure which refracts and focuses sound waves and which is similar in function to certain electromagnetic wave-lengths in that it consists of arrays of obstacles which are small compared with the wave-lengths involved.



The Westrex T501A loudspeaker assembly for smaller theatres features the high-frequency "acoustic lens". Shown here is a 50° lens.



Westrex R7 photographic reproducer (rear view, cover removed) showing special noiseless timing belts that neither slip nor stretch, which are featured for the first time.



Westrex T502B stage loudspeaker assembly for larger theatres features the high-frequency acoustic lens. Shown here are two 80° lenses.

Tinted Car Glass in Drive-Ins

Use of tinted glass for automobile windshields is increasing despite protests from the drive-in industry that such glass interferes with the enjoyment of outdoor movies. About 60% of new cars now coming off assembly lines have tinted windshields and windows compared with 50% a year ago.

The Automobile Manufacturers Association regards the fears of outdoor theatre owners as groundless, claiming that the tint has only a minor effect on visability. However, the auto industry is said to expect a continued demand for clear glass, and the tinted windshields are expected to remain an optional accessory rather than standard.

IN THE

SPOTLIGHT

MORE THAN 300 members of the Association of Documentary and Television Film Craftsmen engaged at independent studios in the New York City area have voted to disaffiliate from the National Association of Broadcast Employes and Technicians (NABET), a CIO unit, and to dissolve so that its members may join the IATSE.

Culminating more than a year of strenuous effort by the East Coast Motion Picture Studio Council, headed by John J. Francavilla, IA representative, this development constitutes a signal victory for the IA and a severe setback to NABET, which has been waging a bitter jurisdictional war with IA over radio-Tv studio workers.

That the arrangement will be finalized was obvious when NABET made the forlorn gesture of revoking its affiliate's charter. IA officials state that the acquisition of these new members will go a long way toward bringing all film production employes under one union banner — the I.A.T.S.E.

These former ADTFC members will be taken into the IA Radio and Television Department and will be obligated by the respective Locals to which they will be assigned, namely: Cameramen's Local 644, Studio Mechanics Local 52, Editors and Cutters Local 771, Assistant Directors Local 161, and Make-Up and Hair Stylists 798.

Organized in 1952, the Studio Council, headed by Francavilla, has been hard at work trying to eliminate dual unionism in the studios and to sign basic agreements with all independent film producers in the New York area. The rapidly mounting use of film for Tv programs has increased this type of work manifold.

ADD: Just as this issue of IP went to press came the news of another sweeping victory for the IA over NABET when, following a Canada Labor Relations Board election, won by the IA 137 to 43, all Tv production employes of Canadian Broadcasting Corp. also went under IA contract.

Result: wage increases of at least 8% (much more in some cases) for more than 300 Tv production workers in Toronto, Montreal, Ottawa, Vancouver, and Winnipeg. Ditto for future CBS outlets such as Halifax, which goes on the air shortly.

Negotiations were spearheaded by Hugh Sedgwick, IA Canadian vice-president, and provide for retroactive raises to February 1 last. Production group includes carpenters, electricians, propertymen, costumers, make-up artists, film cameramen, film editors, cutters, librarians, designers, coordinators, titling artists, script assistants, casting clerks, floor managers (sets) and others—all now members of IA Radio and Tv Department.

Because so many different crafts are involved, the new contract is quite voluminous and complex. For CBC "regular-establishment" employes (those eligible for pensions), it reduces the work week from six days to five. For so-called "casual employes" (now reconstituted as "Tv crafts establishment") it sets up a five-day, 40-hour week, with three weeks vacation and 18 days sick leave per year. For employes having individual contracts, it fixes minimum scales, helpful to set designers and cameramen when their present agreements expire.

• "Never say die" is a motto that paid off for the members of Local 677,



25-30 CLUB OF N. Y. HONORS PAUL REISS, NATIONAL CARBON, AND CHARLEY HOSTMAN, OF RKO.

On dias (left to right) Bill Kunzmann, retired National Carbon veteran; Nat Doragoff, N. Y. State Compensation referee (Local 306); Bob Goldblatt, a founder of the Club; Paul Reiss, National Carbon Co.; Abe Kessler, president of Club; Charles Horstman, RKO projection head; Morris Rotker, past president; Morris Klapholz, secretary of Club; Ben Stern, Club treasurer; Harry Mackler, past president; Allen Smith, manager of National Theatre Supply branch in N. Y., and Jack Winick, vice-president of the 25-30 Club. Present were representatives of National Carbon Co., International Projector Corp., Altec Service Co., and RCA. Also, Ernie Lang, secretary of Local 306 and president of Projectionist Square Club. Delegations from Syracuse Local 376; Hudson County, N. J. Local 384; Westchester County, N. Y. Local 650; Nassau County, N. Y. Local 640, and N. Y. City Local 306 were present.

Kent County, R. I. The owners of a partially-completed drive-in theatre refused to negotiate a contract with the Local officials unless they got a reduction in the projection room manpower, and got a court order restraining the Local from picketing the theatre. Harold A. Benson, secretary and business representative for Local 677, lost no time in getting another court order lifting the restriction, and picketing was resumed.

Other union labor on the job refused to cross the picket line, and completion of the drive-in was delayed. Several weeks of intensive picketing resulted in the capitulation of the exhibitors, and a new contract was signed with the Local calling for the established two-man projection shift. Thus the two-man shift in drive-in theatres that has prevailed for so many years in the state of Rhode Island still remains intact.



The Movie Social Club of Kings County, Inc., comprised of members of New York City Local 306, awarded life membership cards in the Club to Dave Rednor and John Weidner upon their retirement from the Local. Harry Garfman (front center), Local 306 business representative for Brooklyn and Queens, is shown presenting the awards to Weidner (left) and Rednor (right). Club officials witnessing the presentation are (rear, left to right): Harry Weinberg, financial-secretary; Irving Meltzer, president; Dave Steinberg, recording-secretary, and I. Sillman, treasurer.

• John A. Shuff, business representative of Local 364, Akron, Ohio, has been elected 8th vice-president of the IATSE, succeeding the late Roger M. Kennedy, who died last March. Shuff has been a member of the Akron Local since 1921. In 1925 he was elected secretary of the Local, resigning from that office in 1932 to become the business representative, a post he has held ever since. During that period he completed 100% organization of theatres within a 30-mile radius of the city.



John A. Shuff

Under Shuff's leadership, Local 364 has taken an active part in civic affairs, contributing generously to various organizations. He has been personally active in civic and political affairs and during the late 1930's he was Democratic chairman in Akron.

• The annual season's-close party of the 25-30 Club of New York was held the latter part of June at the Grand Street Boys Clubhouse in N. Y. City. Not even the foul weather that evening (which cut deeply into the out-of-town guest roster) could dampen the high good spirits which prevailed at the affair.

Most apropos was the choice of the two men honored at the party—two really - and - truly projection men: Charley Horstmann, maintenance and construction boss for RKO Theatres, and Paul Ries of National Carbon Co., who probably knows more projectionists over a wider range of territory in the East than any other man. Both these lads have given much of themselves to the art and craft of projection and more than earned their respective honorary gold life membership cards and plaques.



Bill Reeves (left) and Tom Brown, members of Local 173, Toronto, Canada, represent a combined age of 154 years. Both men are projectionists and have unbroken records of working in their respective theatres without having missed a single day. For relaxation, Reeves takes an active part in Variety Club affairs; and Brown spends his leisure time in visiting foreign lands—a lifetime hobby.



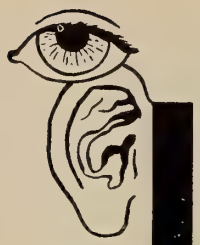
IA President Walsh greeted at the Houston, Texas airfield upon his arrival to participate in Local 279's celebration of the burning of the mortgage on its headquarters building. Completed only four years ago, the building is now owned by the Houston Local free of any indebtedness. Shown above are, left to right: C. Nelson, L. 279, Houston; D. A. Brandon, L. 604, Corpus Christi; Walsh; E. J. Miller, L. 279; Harvey Hill, L. 249, Dallas; William B. Keeler, L. 407, San Antonio, and Clif Sparks, L. 330, Fort Worth.

IA Locals 376, Syracuse; Local 384, Hudson County, N. J.; and Locals 650 and 366 of Westchester County, N. Y., were represented by sizeable delegations, as were many manufacturing and theatre supply companies.

President Abe Kessler of the Club presented the honorary cards; while Bill Kunzmann presented the bronze plaque to his old National Carbon pal, Paul Ries; Morris Rotker, past president of the Club, made the plaque presentation to Charley Horstmann.

A fine spirit and good fellowship pervades this 25-30 Club organization, good for the art and the craft.

EYES and EARS



'Sanity' Projection Standard Proposed by Schlanger

Ben Schlanger, noted theatre architect and close student and advocate of proper screen proportions, viewing angles and the "illuminated screen surround" (maskless) announces several recent installations of a new type of standardized aspect ratio and screen size for *all* picture projection systems.

Schlanger asserts that by projecting anamorphic-type films on a basis of a 2 to 1 aspect ration and the non-anamorphic films on the basis of approximately a 1.75 to 1 aspect ratio, the width of the projected image can be the same for *all* picture projection. The increased flow of film product photographed for the new aspect ratios makes this *width standardization* feasible at this time

Simplified Projection Procedure

Because of projector light limitations for non-anamorphic film, this standardization applies to picture widths of approximately up to 38 feet. When the new type of adjustable anamorphic release prints, such as Paramount's Vista-Vision system, are available, it will be possible to obtain sufficient light output for picture widths greater than approximately 38 feet.

The anamorphic films can be shown with an aspect ratio of 2 to 1 by aperture plate-cropping slightly at the extreme side portions of the film, which eliminates only the most inconsequential photographic detail.

Moveable Masking Eliminated

This new screen standardization also completely eliminates the cumbersome and otherwise undesirable movable maskings on the sides and top of the picture required for the variable size picture projection. It also again makes it possible to introduce *fixed* luminous picture surrounds which found great popularity just about the time that the industry changed to large screens.

Summed up, Schlanger's proposal envisions a *fixed* screen area *via* standard projection lenses (non-anamorphic) and the use of anamorphic attachments *only* in the very largest theatres where very wide screen widths are desirable and feasible.

Also, the Schlanger proposal may be interpreted in terms of good projection for a full week instead of for only one-half week.

Ampex One-Track Magnetic Reproducing System

A single-track magnetic theatre sound system selling for $1625 has been developed by the Ampex Corp., Redwood City, Calif., pioneers in the magnetic aparatus field. The system is specifically built for those theaters desiring the great increase in fidelity achieved by changing from optically-recorded to magnetically-recorded sound, yet do not wish to invest in the equipment necessary for stereophonic sound.

Future Additions Simple

Based on the Ampex Master stereophonic system, the new Ampex single-track system uses identical components so that a theater which purchases single-track sound can, at any later date, install stereophonic sound without having to discard any equipment except one power supply, costing $55. He simply adds to his single-track master system. The single-track system makes use of the theater's present power amplifier and speaker system to hold costs to a minimum.

The entire system consists of two magnetic reproducers, a sound transfer box and extension rod, pre-amplifier, power supply and necessary accessories.

Mounting, Operational Details

Each of the reproducers is mounted on a projector. Adaptor plates are available for fitting the reproducers on any modern projection equipment. Cables lead from the magnetic heads in the reproducer to the transfer box, used to change sound output from one projector to the other. An extension rod makes it possible to operate the transfer swich from either projector position. Cables lead from the transfer box to the pre-amplifier enclosure, which measures 21 inches by 20 inches by 10 inches and may be mounted on the front wall. The on-off switch and the gain control for the magnetic system are included in the enclosure.

The output of the pre-amplifier is fed into the phonograph input of the theater's existing power amplifier. A selector switch, installed by the theater, makes it possible to select either phonograph input or magnetic sound system input.

Meanwhile, prices on the Ampex Master stereophonic sound systems have been drastically reduced, effective immediately. Typical of the new prices is that for a 20-watt, 3-channel stereophonic system, capable of handling a 1,000-seat house, which now sells for $3,195.

This complete stereophonic sound system requires absolutely no extras of any kind to put it into immediate operation, and full emergency facilities are provided.



"May I respectfully suggest, sir, that you use a wide-angle lens?"

Fight Theatre Tv Terrific B.O.

The resounding success of the recent closed-circuit theatre telecast of the Rocky Marciano-Ezzard Charles heavyweight championship fight has led many observers to believe that theatre Tv has lately been slighted as a strong potential source of revenue for exhibitors equipped to use it.

Piped to 61 theatres in 45 cities by Theatre Network Television, Inc., of New York, this telecast did excellent business in almost every location, grossing an estimated $450,000 in admissions.

N.Y.-N.E. Blackout Hurt

A typical example of the success of the telecast is the overall result obtained by 10 houses in the Stanley-Warner theatre chain which grossed $80,000. Several theatres reported business as 50% above previous telecasts. A limitation that kept the nation-wide gross from exceeding $450,000 was the fact that theatres in the heavily-populated New York-New England area were blacked out to avoid competition with ticket sales at the Yankee Stadium, which brought in approximately $500,000.

However, several drive-ins, although they filled their lots to capacity, only broke even. This was because of the high cost of building special towers and bringing in lines for the closed-circuit telecast to the less accessible drive-ins. All lines and relays, provided by American Telephone & Telegraph Co., are rented for only one

month. If it were possible to use them again during that period, a highly unlikely prospect, it would help the drive-in to pay off the cost of wiring. However, even at the break-even level, such telecasts are highly regarded as prestige builders and a lasting reminder of the advantage of outdoor shows of any kind.

Aural, Visual Quality Excellent

Reports from various installations indicate that the picture quality of this telecast was the best yet obtained. Nate Halpern, president of Theatre Network Television, has assembled his own crew for handling these telecasts, and this fact is credited with the constantly improving quality of the transmissions. On the exhibition end, projectionists have now acquired the requisite "savvy" in terms of familiarity with the equipment to provide clean, smooth transit of the image and sound to the screen.

Most significant feature of the successful theatre telecast was the fact that the aforementioned grosses were rung up despite a blow-by-blow description from the ringside via a nationwide radio hookup.

Wollensak Vari-Focus Lens

The Wollensak variable-focus lens attachment now in volume production has attracted much interest in projection circles because of the variety of screen dimensions that may be obtained by simply adjusting a knob on the barrel and by changing aperture plates.

The Vari-Focus lens comes complete with adapter to fit Wollensak and Kollmorgen projection lenses. Bausch & Lomb lenses can be fitted by removing the adapter ring. The attachment weighs 3½ pounds, is 11½ inches long, and has a front diameter of 4 1/16 inches.

Some of the different focal lengths that may be produced by use of the Wollensak attachment and a single objective lens are as follows: with a 3-inch objective, focal lengths between 2¼ and 1¾ inches; with a 5-inch lens, any focal length from 3 to 4 inches.

This Wollensak supplementary lens, priced at $235, provides a means for cleaning without dismantling. The front element is moved to forward position, and the exposed knurled edge can then be turned counter-clockwise and removed. Further details are available from Wollensak Optical Co., Rochester 21, N. Y.

Thank You—

Please add the attached list to our group subscription and bill us on a one-year basis. Incidentally, all engineers employed by Northwest are IA men. We regard IP as an essential part of their technical reading.

Northwest Sound Service, Inc.
Minneapolis, Minn.

Bell Lab's New Battery is Powered by Sun's Rays

A solar battery, capable of converting useful amounts of the sun's energy directly and efficiently into electricity, has been demonstrated by Bell Telephone Laboratories. A small light-absorbing apparatus made of strips of silicon was used to show how the sun's rays could be used to power the transmission of voices over telephone wires. The solar battery also used energy from the sun to power a transistor radio transmitter carrying both speech and music.

Bell Labs reports that it was able to achieve a 6% efficiency in converting sunlight directly into electricity. This compares favorably with the efficiency of steam and gasoline engines, in contrast with other p.e. devices which have never been rated higher than 1%.

Higher Efficiency Expected

With improved techniques, Bell Labs expects to increase this efficiency considerably. Since nothing is consumed or destroyed in the solar energy conversion process, the Bell solar battery should theoretically last forever.

The experimental solar battery uses strips of wafer-thin silicon about the size of common razor blades. These strips are extremely sensitive to light. When they are electrically linked together, they can deliver power from the sun at the rate of 50 watts per square yard of surface.

Tv Station Saturation?

More than 86% of the approximately 670 Tv stations serving 325 communities, envisioned as the Tv potential for the nation, have been authorized. In less than a year the number of Tv stations has been practically doubled. At the beginning of June, 377 Tv stations were operating in 237 communities of the U. S. Another 200 stations have been authorized to go on the air.

The remaining 100 or so applications, in various stages of hearings, will be, for the most part, determined within the next few months. This expansion of the world's greatest medium of mass communications has been accomplished within a year, after it had been forecast that the liquidation of the Tv "freeze" would take years.

Synthetic Vision 3-D Device

Synthetic Vision Corp., of Dayton, Ohio, announces that it is in production on a single-projector 3-D device and an automatic masking system for varying the aspect ratio of a screen from standard size to the 2.55-to-1 CinemaScope ratio.

The 3-D process is based on an attachment placed in front on the projector, mounted on the projection porthole, which appears to function in somewhat the same manner as the Nord and Polalite beam-splitting devices presented not long ago. However, R. V. Bernier, who developed the 3-D device, volunteers no information as to how it works.

Theatre Challenges Tv

Carrying the battle into the camp of the enemy, the Detroit Music Hall has been advertising its film attractions on the Tv pages of the Detroit newspapers in addition to its regular ads on the movie pages. The ads are hard-hitting and bluntly point out the advantages of the motion picture theatre over Tv.

Film Equipment Exports Up In 1953

	1952		1953	
	Number	Dollars	Number	Dollars
Motion Picture Projectors:				
35-mm. Projectors	949	497,794	878	521,890
16-mm. Silent Projectors	1,860	202,099	2,127	204,665
16-mm. Sound Projectors	10,092	3,038,594	7,700	2,572,821
8-mm. Projectors	5,527	350,319	10,957	565,683
Total	18,428	4,088,806	21,662	3,865,059
Other Motion Picture Equipment:				
Sound Recording Equipment	—	618,978	—	794,668
Sound Reproducing Equipment	—	768,181	—	1,120,661
Arc Lamps, Motion Picture	703	200,361	875	326,303
Motion Picture Screens	—	299,562	—	903,649
Motion Picture Projection Equipment Not Elsewhere Classified, & Parts	—	1,732,187	—	2,077,774
Motion Picture Studio Equipment	—	802,306	—	1,053,539
Total		4,421,575		6,276,594
		$ 25,692,819		$ 29,352,273

Courtesy, U. S. Department of Commerce

EVOLUTION OF THE MODERN PROJECTION LENS

(Continued from page 6)

This lens was made possible by the discovery at Jena of new barium-crown glasses in 1886. As its name suggests, the anastigmat is corrected for the distortion called astigmatism and, simultaneously, for field-curvature. Fig. 2 shows the three elements of the anastigmat in cross-section.

The simple anastigmatic "triplet" shown here, even though it contains one lens less than the Petzval aplanat, is moderately expensive on account of the extreme accuracy with which the lens-surfaces must be figured. Expertly made with the highest-grade glasses, the anastigmat is an excellent medium- to short-focus lens. Although it gives a very flat field of fairly wide angular coverage, center definition usually does not quite come up to that obtainable with the Petzval, and contrast is also inferior to the brilliant images which the aplanat yields.

The triplet-type anastigmat is not much used in American theatres. The best-known example of this type of projection lens is the Meyer Trioplan (Goerlitz, Germany).

The Improved Anastigmat

A very satisfactory variant of the simple anastigmat is the "split-front triplet" shown in the lower drawing of Fig. 2. This was also originated by Abbe and Schotte. It serves the same purpose as the simple triplet, but it is ordinarily designed for somewhat longer focal lengths. The split-front anastigmat gives excellent definition over a wide, flat field with good pictorial contrasts. Similar in type is the Zeiss Kipro-Anastigmat.

There is only one other type of projection lens to be considered—the very latest 4-element, 6-lens Gaussian doppelanastigmat. A curious thing about this lens is that it was the first true anastigmatic lens ever made, even though it is the most advanced in design. Abbe and Schotte made their triplet anastigmat in 1890, but this superior quadruplet-type anastigmat was invented about 50 years earlier. It is, in fact, of about the same age as the old standard Petzval aplanat! Is there *nothing* new under the sun?

Every projectionist who keeps abreast of magentic sound developments by reading IP knows what is meant by "degaussing" projector parts. To degauss is simply to demagnetize. A *gauss* (rhymes with "house") is a unit of magnetic field-strength. Just as the volt, ampere, ohm, watt, farad, and henry were named after famous scientists, so also the gauss.

Gauss, A Versatile Genius

Karl Friedrich Gauss was a mathematical wizard who investigated the laws of electricity and magnetism and dabbled (very competently) in things optical. He once made a special telescope objective which, in basic design, was the same optical system as that employed in our most modern projection lenses!

Figure 3 shows the cross-section of the Gaussian doppelanastigmat. Note that the front and rear elements are single-lens units (as in the simple anastigmat) and that the two internal elements are meniscus-form achromatic doublets. The two lenses of each doublet are cemented together in all but a few makes.

Now, just what are the specific virtues, the superior characteristics, of the doppelanastigmat? First, all aberrations have been reduced almost to the vanishing point in the Gaussian lens. It has excellent resolving power, giving sharp, crisp images, and it reproduces pictorial contrasts nearly as well as a good Petzval aplanat. Most important, next to excellent definition, is the extremely flat and wide field (30 to 50 degrees) obtainable with this magnificent lens. This is the only regular projection lens that yields a

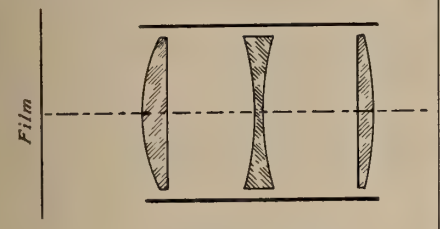
Lens E. F. In Inches	Approx. Angular Field	Type of Lens Recommended
1.00	53° 8'	Use special process-projection wide-angle lenses. Focus-drift, flutter, and vignetting severe.
1.25	43 37	
1.50	36 52	
1.75	31° 54'	Use Gaussian doppelanastigmats. At F:2 and faster speeds in the shorter focal lengths, film flutter and drift may be conspicuous; at slower speeds, hot-spot effect (vignetting) may be pronounced.
2.00	28 5	
2.25	25 2	
2.50	22 37	
2.75	20 36	
3.00	18° 56'	"Split-front" anastigmats of good quality may be used in this focal-length range.
3.25	17 30	
3.50	16 16	
3.75	15 11	
4.00	14 15	
4.25	13 26	
4.50	12° 41'	
4.75	12 1	
5.00	11 25	
5.25	10° 52'	Use Petzval aplanats. No undue film-flutter or focus-drift effects in this range regardless of speed of lens.
5.50	10 23	
5.75	9 56	
6.00	9 32	
6.25	9 9	
6.50	8 48	
6.75	8 28	
7.00	8 11	
7.50	7 38	
8.00	7 10	
9.00	6 21	

TABLE I

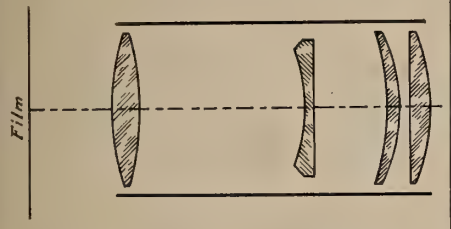
picture having sharp focus from edge to edge in the short focal lengths.

Most Advanced Design

When you read statements like these in the lens advertisements in IP, you may safely believe them when the



Anastigmatic



"Split Front" Anastigmatic

FIG. 2. At the top is shown the "triplet-type" anastigmat. This lens provides a wider and flatter field than the Petzval aplanat, but usually poorer center definition and less brilliant contrasts. An improvement is the "split-front" anastigmat shown in the lower drawing.

lenses referred to are doppelanastigmats. What are the trade names of some of them? The Super-Snaplite made by Kollmorgen is a Gaussian, so also the Super Cinephor made by Bausch & Lomb, the Super-Lite Hilux made by Projection Optics, the Alinar made by Zeiss Ikon (Stuttgart), and

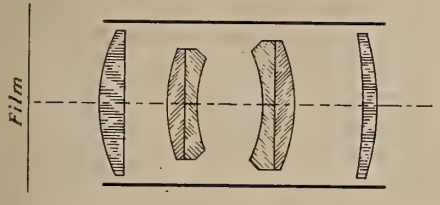


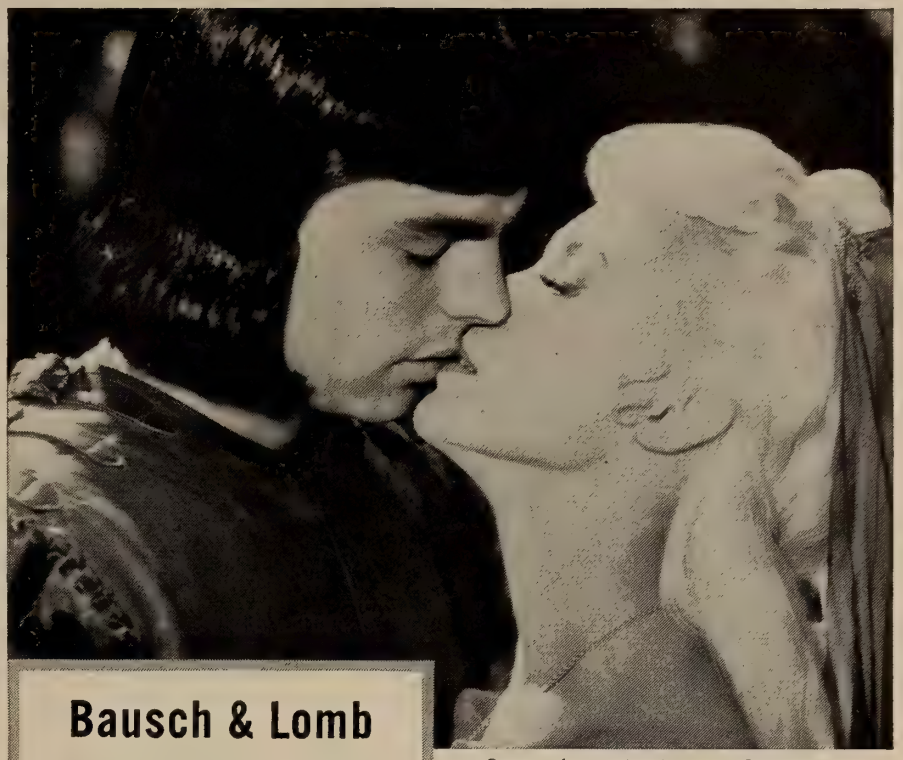
FIG. 3. This is the Gaussian doppelanastigmat, the most modern type of projection lens. It provides a wide, flat field, making it suitable even for lenses of the very shortest focal lengths. The image-quality obtainable with the "Gaussian" is superb. Kollmorgen's Super-Snaplites and Bausch & Lomb's Super Cinephors are of this type. Highly recommended in all the usual focal lengths.

the Super Kiptar made by JSCO (Goettingen). And there are many other makes of Gaussians of excellent quality.

The Zeiss Alinar merits special attention as the first projection lens of this type. Like Gaussians of Amer-

Loaded with

"COME BACK AGAIN" Appeal!



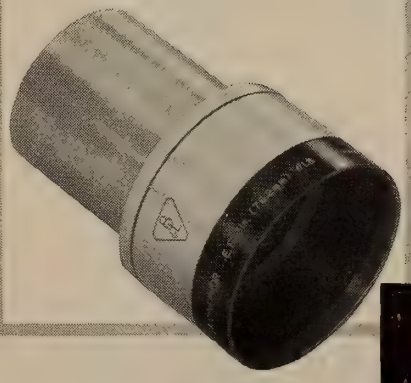
Scene from "Prince Valiant," 20th Century-Fox CinemaScope production

Bausch & Lomb

f/1.8

Super Cinephor

Projection Lenses



Sharpest image, uniform brilliance . . . edge-to-edge . . . on any screen!

Patrons enjoy *your* movies more because they see them better . . . when you use the new *f*/1.8 Super Cinephor lenses. They keep coming back to *your* theatre for today's clearest, sharpest, brightest movie images:

Normal 2D-3D, Expanded 2D-3D, and CinemaScope.

WRITE for new catalog E-123. Bausch & Lomb Optical Co., 31631 St. Paul St., Rochester 2, N. Y.

BAUSCH & LOMB

SINCE B&L 1853

ican manufacture, the Alinars have optical speeds ranging from F:1.8 to F:1.9. All of these are commonly regarded as F:2 lenses.

The performance of *all* modern projection lenses, whether Petzval aplanats or Gaussian doppelanastigmats, is greatly improved by anti-reflection coatings of magnesium fluoride on the glass-to-air surfaces. Not only does a coated lens transmit from 15 to 25% more light than an uncoated one of similar construction, but picture contrasts are better, giving lifelike "snap" and brilliant clarity to the images.

Then, too, modern lenses are faster than the old-timers. For all except lenses of short focus, the larger lens diameter is a distinct advantage, providing brighter, more evenly illuminated pictures without serious loss of "depth of focus." In the case of very short-focus lenses, loss of focus-depth unfortunately exaggerates the definition-ruining effects of film-flutter and buckle. This can be minimized by using "slow" short-focus lenses, although the hot-spot effect of lens-vignetting is increased by lenses too small in diameter.

Ordinary "wide-screen" projection requires the use of short-focus lenses. The wide-screen aperture has the same width as the standard aperture (0.825 in.), but less height. The exact height of the aperture depends, of course, on the aspect-ratio employed. For an aspect-ratio of 2:1 the aperture-opening will have a height of only 0.4125 inch instead of the standard 0.6 inch.

In order to maintain the same height of image as the standard screen, more magnification is required. This is supplied by the short-focus lens.

Wide-Screen Problems

This writer is a bit skeptical of the so-called wide-screen type of presentation because the defects of short-focus projection, together with emulsion graininess and inefficient screen illumination due to the smaller aperture, result in a comparatively poor image. Then, too, the relatively small vertical dimension of the wide screen is pictorially unnatural.

Somewhat larger screens could advantageously be used in most theatres, for the day of midget-sized screens is definitely over. It is our belief, nevertheless, that the standard photo aspect-ratio of 3:4 (more exactly 1:1.375) should be retained. Height is as important as width; and since the standard aspect-ratio provides somewhat more width than height, pictorial versatility is lost by expanding the width of the screen *without increasing the height proportionately.*

Advice on CinemaScope

CinemaScope, despite the generally poor quality of the screen image, holds the greatest promise of development into a process of enduring value for spectacular feature films, musical extravaganzas, and travelogs. Now, the performance of the CinemaScope anamorphotic cylindrical lens (or the alternative Tushinsky prismatic lens of adjustable expansion-factor) depends in a great measure upon the

HERE'S SOUND ADVICE!

If the confusion that surrounds the various sound systems being offered today has delayed your decision on just what you should install in your theatre, consider these facts:

Three of the majors — M-G-M, Paramount and Warner Brothers — have already announced that *all* future productions will have Perspecta Stereophonic Sound. Other studios are following their example.

Why has Perspecta Stereophonic Sound been chosen as standard — a standard certain to remain for years to come? For three very good reasons:

1. The movie industry wants to make money. To do this they know they must keep your box-office busy. Perspecta Stereophonic Sound will do just that by giving the movie-going public the dramatic realism they want.

2. Perspecta Stereophonic Sound is a system every movie exhibitor can afford to install.

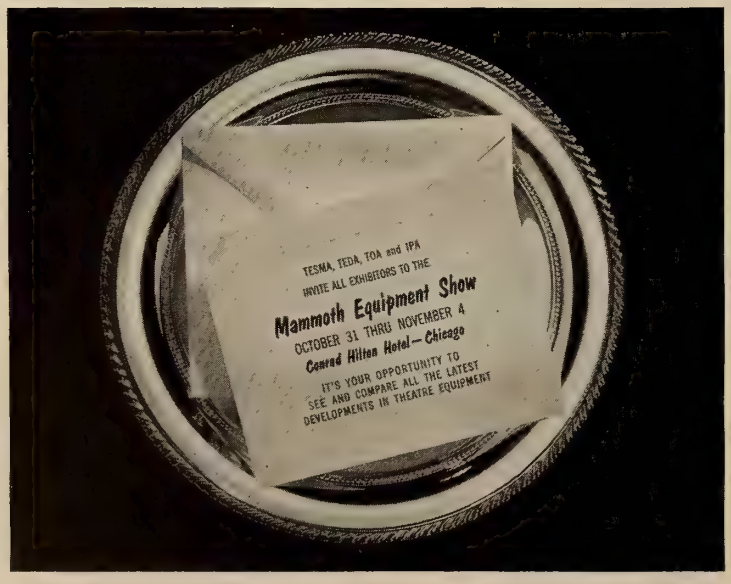
3. Perspecta Stereophonic Sound Track operates identically with the optical sound track you've been using for years except for the inclusion of three low-level, low-frequency tones "heard" only by the Integrator, which automatically controls volume and direction for true stereophonic effect.

The Perspecta Stereophonic Sound Integrator, design-engineered by Fairchild, makes this system available to you at a price you can afford. Only one Fairchild Integrator serves all projectors in the booth — controls Perspecta Stereophonic Sound through any 3-channel sound system of standard make. And projector modifications are not required.

Call, wire or write *now* for full information on your specific theatre sound problem.

FAIRCHILD RECORDING EQUIPMENT

MOTION PICTURE SOUND DIVISION • WHITESTONE 57, NEW YORK



performance of the projection objective lens.

For the best CinemaScope the very best projection lenses must be used. We recommend anti-reflection-coated Gaussians of F:2 (or F:1.9) speed, although Petzvals in the longer focal lengths are just as good if similarly fast and anti-reflex-coated.

Short-focus projection lenses are *not* used for CinemaScope! For this special type of wide-screen presentation we use the *regular* projection lenses. It is the anamorphotic or prismatic auxiliary lens that "spreads" the CinemaScope image over the wide screen.

There are, as we have seen, four main types of theatre projection lenses (not counting rear-projection lenses and special 7-lens short-focus jobs). These are the Petzval aplanatic (the simplest and most common); the anastigmatic, the split-front anastigmatic, and the Gaussian doppelanastigmatic, which is the most modern type. The American projectionist need only consider the Petzvals and the Gaussians when selecting lenses, as the triplet and split-front anastigmats are not widely marketed in the U.S.A.

In Europe the Petzvals are still manufactured, as they are very desirable in the longer focal lengths; but the present tendency of American lens-manufacturers is to switch over completely to the more expensive Gaussians in all focal lengths up to 7 inches.

After careful comparison of these two types of lenses in action, this writer is of the opinion that the regular Petzvals (F:2, coated) are advantageous in all the longer focal lengths down to and including 4.5 inches. For all shorter focal lengths (4.25 inches down to about 2 inches) Gaussians of modern construction offer distinct advantages in their wider field coverage. These recommendations are summarized in Table I.

MPRC New Projection Aperture

Recommendations stemming from extensive experiments by the Motion Picture Research Council in the development of a single standard aperture size for CinemaScope projection have been forwarded to principal exhibitor organizations throughout the U. S.

The recommended aperture is 0.715 inches high by 0.839 inches wide, centered on the standard 0.600 by 0.825 aperture, precluding the necessity of shifting the projector in changing from CinemaScope to standard projection.

According to MPRC findings, projectionists should use the greatest film areas available to obtain the "best possible" quality, and the recommended aperture size is said to allow better utilization of the light available in the projector.

Error: Genarco Sales Projector

The Sales Robot advertising projector manufactured by Genarco, Inc., 97-04 Sutphin Blvd., Jamaica 35, N. Y., was described recently in IP as projecting a picture 5 by 6 *inches* on a rear projection screen, whereas this advertising-message projection unit actually projects a picture of 5 by 6 *feet.*

THE ACE CUE MARKER

The World's Best

One push to left or right and all cues are made in 16- and 35-, Standard, Tv, or CinemaScope

See your dealer or write to

ACE ELECTRIC MFG. COMPANY
1458 Shakespeare Avenue
New York 52, N. Y.

Real b.o. appeal . . . CHICAGO

A smash hit . . . BOSTON

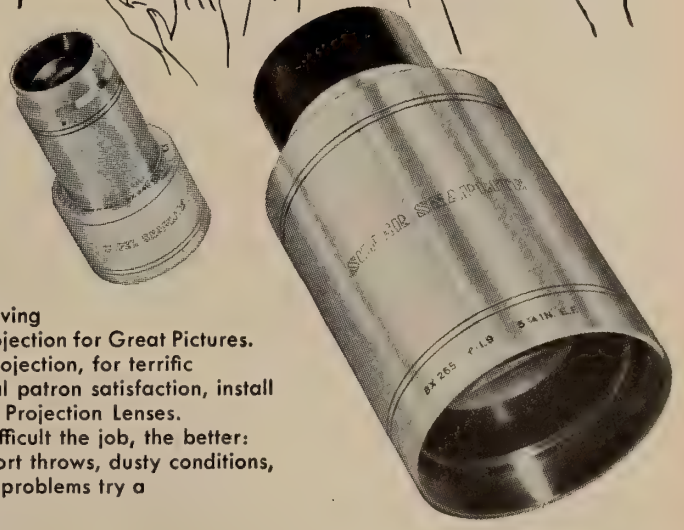
Superb projection . . . DALLAS

Snaplite Lenses

Extraordinary impact . . . LOS ANGELES

This is it . . . KANSAS CITY

Powerful, colossal light . . . NEW YORK



Everywhere in Theatres and in Drive-Ins, SUPER SNAPLITES are giving patrons Great Projection for Great Pictures. For wire sharp projection, for terrific definition, for real patron satisfaction, install SUPER SNAPLITE Projection Lenses. And, the more difficult the job, the better: large screens, short throws, dusty conditions, if these are your problems try a SNAPLITE Lens.

Ask for Bulletin 212.

KOLLMORGEN Optical CORPORATION

Plant: Northampton, Massachusetts

New York Office: 30 CHURCH ST., NEW YORK 7, N. Y.

New Model Perspecta Units

A new model of the Fairchild Perspecta stereophonic sound integrator, designed as Model 315C and consisting of the standard integrator and power supply mounted on vertical chassis of the recessed type, will permit mounting in theatres installations where horizontal space is at a premium. The unit is designed for normal rack mounting and features easy accessibility to all components for installation as well as service. All under-chassis wiring may be reached by removal of the front panel.

Nation-Wide Pay-See Tv Urged

Big pitch for subscription pay-as-you-see home Tv by all Tv stations, network and individual, is being made by Dr. Millard Faught, consultant of N. Y. City. The Dr.'s pitch is as follows:

1. Subscription Tv would be compatible with and a supplement to advertising-sponsored programming on all regular Tv stations, requiring no separate channels.

2. It would provide new economic support for present stations and new stations, and by adding premium programs not now sponsorable, would also greatly expand the Tv audience.

3. The net time and audience available to advertisers in the expanded Tv picture would be greater than now, but their share of all Tv's costs (which advertisers now pay in full) would be considerably reduced.

PERSONAL NOTES

James M. Cunningham has been appointed western regional sales manager for General Precision Laboratory, Pleasantville, N. Y. A native Californian, Mr. Cunningham has a long background as a design engineer and system engineer, having been associated with Western Electric, American Broadcasting and Hughes Aircraft. He will make his headquarters in Glendale, Calif., and will be in charge of all commercial sales work of GPL on television transmitters, cameras, projectors and allied equipment.

Jack Robinson has been named vice president of the GoldE Mfg. Co., which produces reel-end alarms and other items of projection equipment. Robinson was formerly president of the Acme-Lite Mfg. Co., another producer of products for the photo industry.

Sam G. Rose, president of the Victor Animatograph Corp., was presented with the Pioneer Award of the Society of Motion Picture and Television Engineers for his 30 years of service to the industry.

IA OBITUARIES

HENRY T. NORTH, 67, member of Local 486, Hartford, Conn. and projectionist at the Allyn Theatre, died last month. He joined the Local back in January 1920 and at one time served as its business representative. For many years he ran Kiddie shows for children at various institutions, particularly during the Christmas holiday, devoting much of his spare time to this worthy cause. His brother, Charles S., is the present b.a. of the Local.

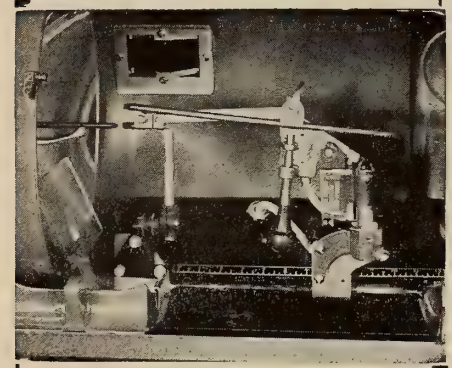
Romulus Albu, Sr., 52, member of Detroit Local 199, died suddenly recently. He had been resting at his summer home at Port Sanilac when he was stricken with a heart attack. He is survived by his wife and a son.

Good Judgment Dictates
that you use the
CRON-O-MATIC
Fully Automatic
CARBON SAVER

on Ashcraft "D" and "E", Brenkert-Enarc, Peerless Magnarc, and Strong Mogul lamps.

AVERAGE CARBON SAVING
$400 A YEAR

Burns average lengths (3¼") down to ¾", saving 2½" or 22.2% of carbon costs. Uses positive carbon stubs of any length, without preparation. When entirely consumed, the new carbon goes into use without losing the light, or otherwise affecting lamp operation.



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Mid-Summer Musings

JUST about the most heartening development in the motion picture exhibition field during the past year and a half was the recent decision by 20th Century-Fox to revise its policy on the showing of CinemaScope pictures. This was a smart and profitable move by Fox, and also a great relief to hard-pressed exhibitors.

It lifted from the exhibitor the burden of enforced outlay of capital for magnetic-stereophonic sound-reproducing equipment, and it made available to every theatre anywhere in the world the vitally-needed 20th-Fox product. Having opposed Fox in its previous CinemaScope policy, IP must now salaam.

All's Well that Ends Well

Let it not be assumed that IP didn't take its lumps during the controversy over Fox's insistence on controlling the method of CinemaScope presentation and the requirement of specific special equipment. One of the sorest spots on the IP anatomy developed as a result of our views relative to the stereophonic magnetic sound reproduction—and, of all things, the most savage of these jabs emanated from members of the organized craft on the West Coast.

IP never opposed stereo magnetic sound reproduction *per se*. Its stand apropos these 20th-Fox requirements was three-pronged.

1. It imposed a terrific financial burden upon the thousands of exhibitors who were struggling to keep going even at the then normal pace. Moreover, it did not of itself insure *continuing* good grosses after such an installation was made, and the first wave of customer interest had subsided—as it has. There was not even a guarantee to the point of paying off for the equipment and installation costs.

2. It denied to thousands of exhibitors access to all 20th-Fox product.

3. It seemed to IP that in thousands of small theatres the use of a truly wide screen was precluded by the physical characteristics of these theatres. Also, in many of these theatres the effect of stereophonic sound was lost.

Best for Big Houses

Naturally, when Fox started to mull over C'Scope presentation they thought BIG in terms of both screen size and sound accompaniment. This was fine for the big first-runs and even for some medium-size houses. But it seemed to IP that they thought TOO BIG in terms of the smaller theatres from both the architectural and economic view-points.

Stereophonic sound may seem to many people indispensable for a *very* wide screen in a large theatre. It would prove extremely interesting, however, to learn the *average* screen width possible in 80% of the total number of theatres.

Overall, it seems conclusive that IP's attitude was based almost wholly upon *economic*, not technical, consi-



derations—the cost of equipment and the enforced lack of needed product.

Happily, the elimination of all restrictions in the manner of presenting C'Scope pictures has resolved these vexing problems, and now the vitally needed product of all producers may be played anywhere on available equipment.

Another reason for increased interest in CinemaScope is the greatly improved photographic quality of the release prints. The special Fox presentation of "Advancing Techniques of CinemaScope" was a *pot pourri* of trailers describing forthcoming C'Scope films with a narration by Fox executives, demonstrating conclusively that the technical quality of CinemaScope films has increased tremendously since "The Robe." Much of the credit for this improvement is given to the new Bausch & Lomb anamorphic camera lenses that recently became available; but the consensus of informed technical opinion is that the higher quality is basically a result of steadily increasing "know how" on the part of technicians.

What stood out most clearly at Fox's demonstration of the improved CinemaScope picture was the increased sharpness and greater depth of focus now being obtained. As mentioned before, a new series of B & L Lenses which combine the camera taking lens and the anamorphic attachment, are chiefly credited with the improvement.

Eventually the new B & L camera lenses will include a series ranging from 13-mm to 152-mm in focal lengths, or in terms of horizontal field angles, from 122 degrees to 18 degrees, giving exceptional leeway to the cameraman and foreshadowing even finer CinemaScope photography. Until recently, only 35-, 40- and 70-mm lenses have been delivered.

The Todd AO Process

Another noteworthy recent event was the demonstration of the Todd AO process in Hollywood after a year or more of secret development by the American Optical Co. This is a wide-angle camera and projection process that utilizes a 65-mm film and attempts the 3-projector Cinerama system with just one machine. Many observers say it succeeds, but the process will have to be shown to the public on a nationwide basis before its merit can be really judged.

The fact that the demonstration was widely praised is interesting in view of the fact that old Ernemann machines were used. These projectors, said to be in bad condition, had been laying around Hollywood since the big-film experiments of the 20's. New projectors, designed for Todd AO by the Phillips Co., of Holland, were not yet available. The screen used for the demonstration was 51 feet wide and 25 feet high, with a curve 13 feet in depth.

The shots shown in the demonstration included scenes that aimed at but most important was test footage from "Oklahoma" to be filmed in the Todd AO process.

NOTE: All long-time readers of IP will understand, of course, that IP does not now and never will lend acceptace to any projection aspect ratio above 2:1 — at the outside.

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NEW LIGHT ON THE PAST

(Continued from page 11)

Laboratory injected added excitement into the turbulent picture.

In his letter to Armat dated May 25, 1922, Edison refers to a Mr. Dickson in harsh language. Laurie Dickson, together with other Edison mechanics, was instrumental in the production of the Kinetograph, Edison's successful movie camera. But Dickson wanted to go beyond peep-hole viewers. He believed wholeheartedly in the feasibility of projecting motion pictures.

Edison's "Follow the Leader"

Edison, as we have noted, would have no part of projection until the successes of such projection pioneers as the Lumiere brothers of France and Robert Paul of London forced him to enter the field.

When Dickson learned that Major Woodville Latham and his two sons, Otway and Gray, were seriously interested in projection, he extended assistance in developing machinery for the new art; whereupon Edison, naturally, suffered an acute attack of disgruntlement. So, we learn, Dickson "double-crossed" the Great Inventor and "sold me out" to Latham "for his own benefit."

The Latham Showings

Now, the Lathams operated the world's first movie theatre two years before Armat played "The Sea Waves" and selected shorts as an audience-chaser at Koster and Bial's Music Hall. For, on May 20, 1895 in a vacant store at 153 Broadway, New York City, the Lathams established a "picture parlor" in which they screened the Corbett-Courtney fight. The screen results were nothing to brag about, but they *were* motion pictures, and they *were* projected on a screen for cash customers.

Edison read about this show in the New York papers and promptly "blew his top". He fumed. He called in reporters. He threatened to bring suit, not only against the Lathams, but also "against all who use the Latham Pantoptikon."

Woodville Latham, ruffled by Edison's peremptory blast, took pen in hand. In an open letter dated April 22, 1895, Latham questioned Edison's integrity and challenged the Great Inventor to project motion pictures on a screen "as I have done" and "to do so at once — if you can!" Edison couldn't — he didn't have a movie projector.

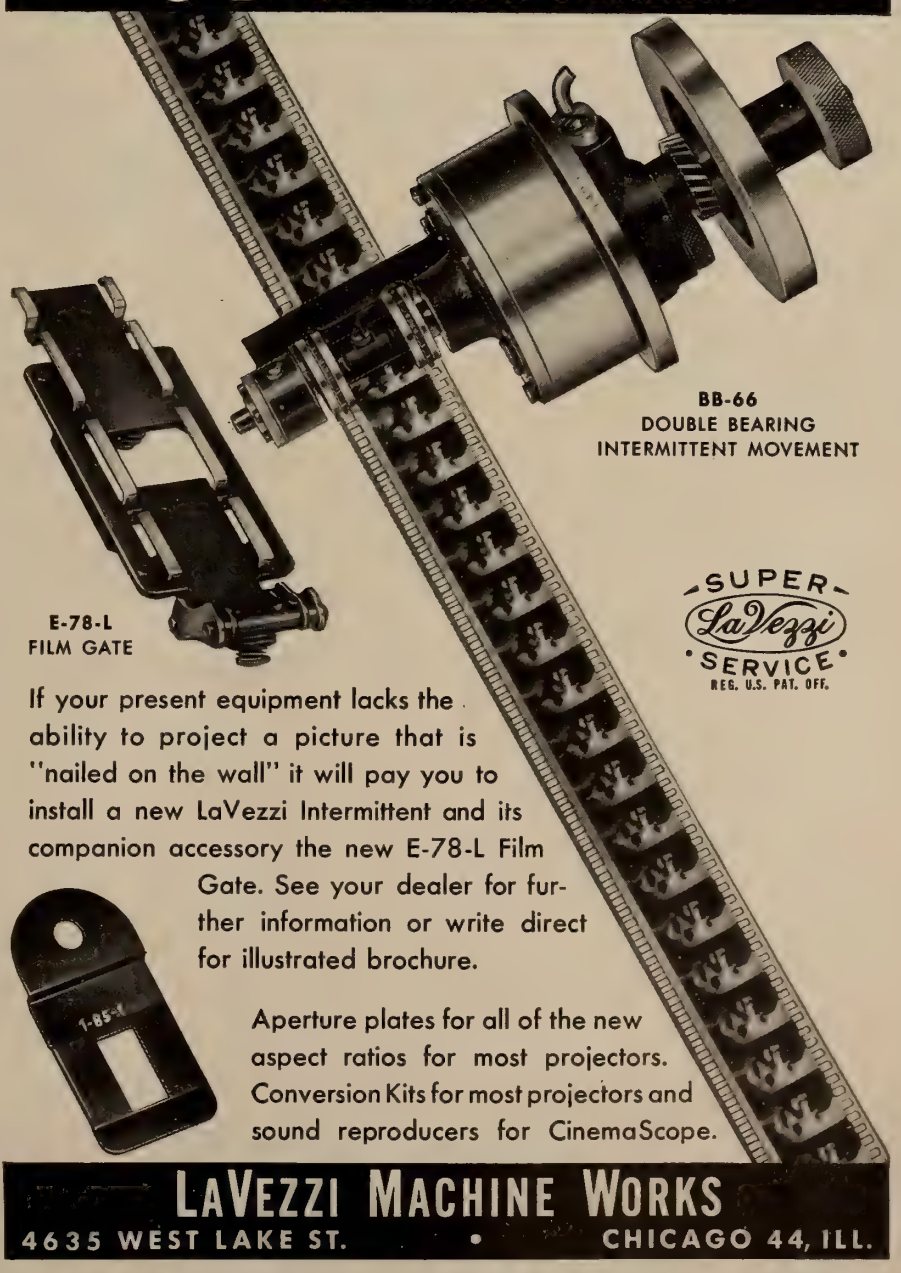
To the art of projection the Lathams contributed the film-loops above and below the gate and intermittent in both cameras and projectors. Armat subsequently adopted the "Latham loops."

Associated with Thomas Armat was Francis Jenkins, also of Washington, D. C. Since both were interested in the projection of movies, they formed a partnership which lasted only the few months required to build a crude projector — Armat's first. Armat subsequently built two better machines after the partnership was broken and, according to Edison's letter, "showed up Jenkins as a fakir" *(Edison's spelling)*. Fakir or faker, Jenkins flew the coop and worked solo.

"Dog" or "Beater" Movement

The "dog," or "beater," movement, which Mr. Gooch tells us was preferred by Jenkins, is pictured in two dis-

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tinct varieties on page 5 of the July 1952 issue of IP. Jenkins' preference is entirely understandable, for in the old days the beater-type of intermittent was not a device to be ignored. It had many ardent advocates among projectionists. It has been used in many famous machines of yesteryear including the Jean LeRoy projector, the Prestwich, and the Victor.

No less a personage than Nicholas Power seriously considered the dog intermittent before he hit upon his famous pin-cross movement.

The dog-movement was noisy and rough on film, and it imparted jumpiness to the projected pictures. On the credit side were its extreme mechanical simplicity and its ability to handle film having torn sprocket holes.

Edison, Dickson, Latham, Armat, and Jenkins — a felicitous group indeed. All members of this happy little family undeniably made really significant contributions to the art of projection — even the Wizard of Menlo Park who invented the movie camera and established 35-mm film having 4 perforations to each frame on each side of the film. But progress was also being made in other quarters. To simplify matters, let's list the more important developments in projection between 1894 and 1898.

Cinematic Bibliography

SEPTEMBER, 1894. The Lathams, inspired by Edison's peep-show device, conceived a desire to *project* moving pictures.

MARCH, 1895. Successful Lumiere exhibition before a large audience at an industrial conclave in Paris. 35-mm film having one circular perforation per frame, run at the speed of 16 frames per second. Claw intermittent in combination camera-projector called the Cinematographe. This was the first 35-mm projector.

APRIL, 1895. Latham's completed Pantoptikon projector used for publicity showing.

MAY, 1895. The Lathams' movie theatre on Broadway opened — and soon closed. The Pantoptikon a dismal fizz.

AUGUST, 1895. All set up and ready to go was the Armat & Jenkins projector Number 1./ 35-mm film with Edison's perforations. 14-slotted star in Geneva-type intermittent that failed to intermit.

NOVEMBER, 1895. Wintergarten (Berlin) exhibition of "living photographs" by Max Skladanowsky. Weird double-film system for flickerless projection. Wide film, 8 frames per second.

Double-Geneva, 7-Slot

FEBRUARY, 1896. Robert Paul 35-mm screening at Finsbury Technical College, London. Bob used a double Geneva-type intermittent having 7 slots per star-wheel.

FEBRUARY, 1896. Armat's second machine, christened Vitascope, 35-mm, beater intermittent. It worked.

APRIL, 1896. Tom Armat's Vitascope showing of 35-mm Edison films at Koster & Bial's Music Hall, New York. Good results, but Edison's 48-frames-per-second epics slowed the action on the screen. Music Hall audiences, instead of being chased out of the theatre by pix, demanded encore.

Historic Showing in Germany

NOVEMBER, 1896. Messter's 35-mm, 16 frames-per-second exhibition at the Apollo Theater, Berlin. *First use of standard 4-slotted star-wheel in Geneva intermittent.* Messter's showing marked birth of standard film, for Edison's film specifications and the Lumieres' film-speed were combined.

MARCH, 1897. Armat's third projector, also called Vitascope, patented. Employed Messter's Geneva intermittent.

1897. Edison licensed by Armat. The Edison projectors called Kinetoscopes, like the peep-hole viewers. Paul of London adopts standard Geneva movement and invents safety devices.

1898. The Motiograph Optigraph projector, the first practical machine besides the Edison-Armat Kinetoscope for professional 35-mm projection.

1899. Projectors appear by the dozens, most of them similar to the Kinetoscope and the Optigraph, both of which had *open* Geneva movements.

Golden "Nickelodeon" Decade

1900 - 1910. The era in which commercial projector manufacturing began in earnest. The movies grow into a big industry and capture public fancy. "Nickelodeons" spring up everywhere, about 50,000 in the United States, almost 5 times the number of American film theatres in existence today.

I must say again that I find nothing in either Mr. Gooch's or in Armat's letters in violent disagreement with what I wrote in the articles referred to. Minor divergencies of opinion as to the priority of this or that detail of projector construction are bound to occur in a subject so confused and obscure as the history of motion picture arts and sciences.

To You Old Timers . . .

Any of you fellows who have grown up with the motion picture industry and who have used the earlier mechanisms can make a distinct contribution to projection lore by communicating to IP for publication herein all your experiences with these early-day projector mechanisms.

New Lamphouse Blower

A lamphouse blower unit intended to provide more complete ventilation to both lamphouses and projection room has been marketed by the Drive-In Theatre Mfg. Co. of Kansas City. The new blower unit was designed because it was felt that the increased heat and dust in the lamphouse resulting from the use of higher amperages made it advisable to provide a single-stack blower in addition to the company's double unit where each lamphouse "T's" into one pipe.

Forced Ventilation Process

Ventilating action is accomplished by a "squirrel-cage"-blower on the outside of the stack which forces air through the pipe via a special tube which runs inside the stack and releases the air with a forced jet action that creates the suction needed.

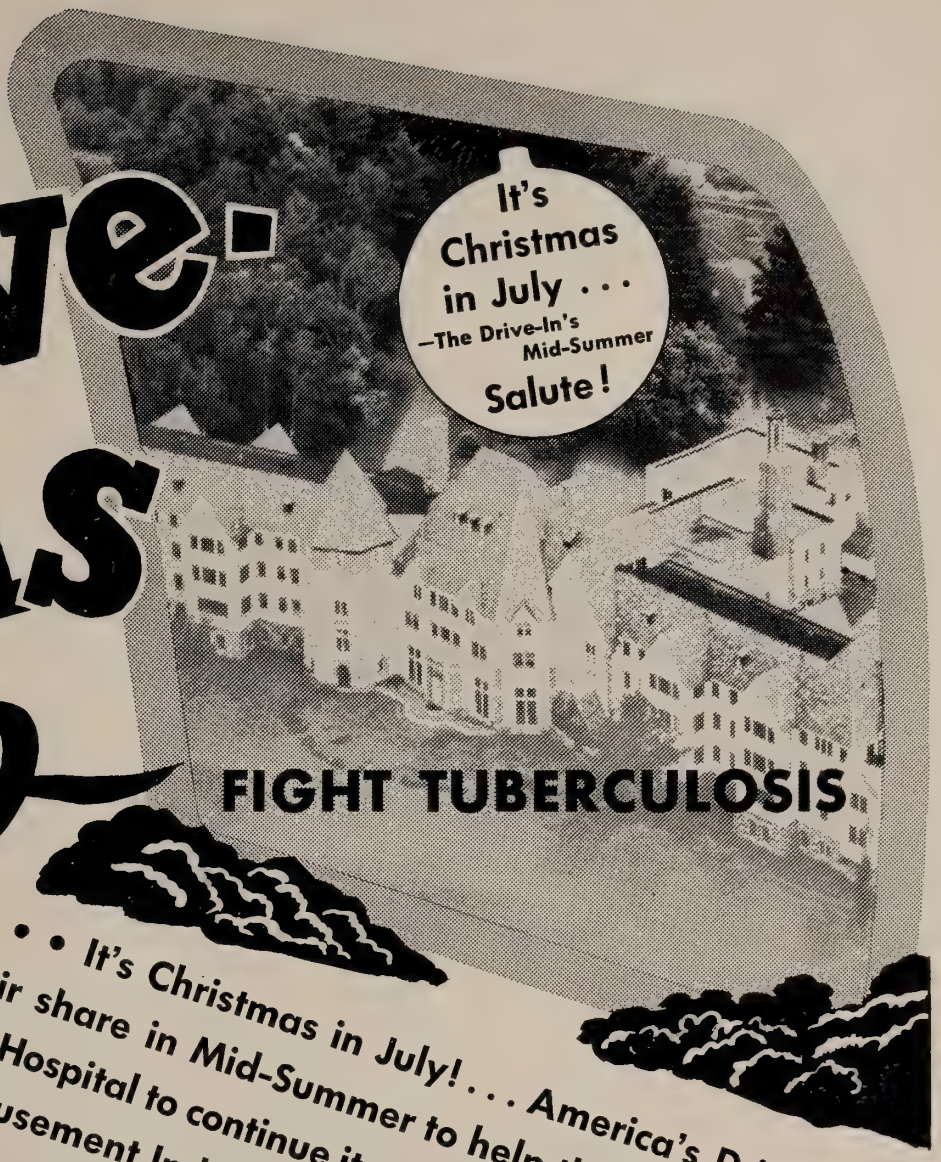
It is recommended that the blower stack not be connected directly with the lamphouse but rather entered into a "pan" or surrounding collar so that some air may be drawn from the outside of the lamp rather than entirely from the inside.



The DITMCO jet-action, single-stack blower which is designed to exhaust the arc lamphouse of all the heat, dirt, gasses and carbon dust.

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It was on that date, Thomas Alva Edison showed the world its first continuous motion picture — 50 feet of film, running 13 seconds. Five years later in April of 1894, Edison's "Kinetoscope" was installed at the spot which today is 1155 Broadway. And so the commercial history of motion pictures began.

Things started to happen . . . in June 1895, Thomas Armat developed the "Vitascope" which incorporated the intermittent movement, the basis of all modern projection. The following April, Koster and Bials' Music Hall installed the first "Vitascope" and showed the first 1000 foot reel, setting the standard for "one-reelers."

In June 1901, George Melies, a Paris magician fascinated by the new medium, introduced fade-outs, dissolves, and double-exposures to his act — and laid a foundation for modern motion picture photography.

It was in Pittsburg in November 1905, Motion Pictures as we know it today "arrived," . . . the first picture story, "The Great Train Robbery" opened in the first "Nickelodeon."

By now public fancy had been caught. In 1909 the multi-reel picture made its appearance — and the industry was on the march. Product improved, story improved, photographic techniques improved, the star system was born, motion picture houses opened throughout the land — throughout the world — and then . . . in 1927, with the opening of the "Jazz Singer" at the Winter Garden, sound burst forth upon the screen, followed shortly thereafter by all the beauty of color.

Now, let's take a "flash-back" to 1911. That was the year "Simplex" introduced its first projector and with it an improved image was seen upon the screen. With each new advance "Simplex" was there, working with the pioneers in sound, developing new techniques for the improvement of the projected image, always building better projection and sound equipment.

In recent times the motion picture has taken further giant strides with the introduction of full length features in 3-D, the panoramic magnificence of Cinemascope and wide screen plus the true-fidelity of stereophonic sound. Again it was "Simplex" which took the lead — always ready, always prepared, always a step ahead, with the very finest equipment available.

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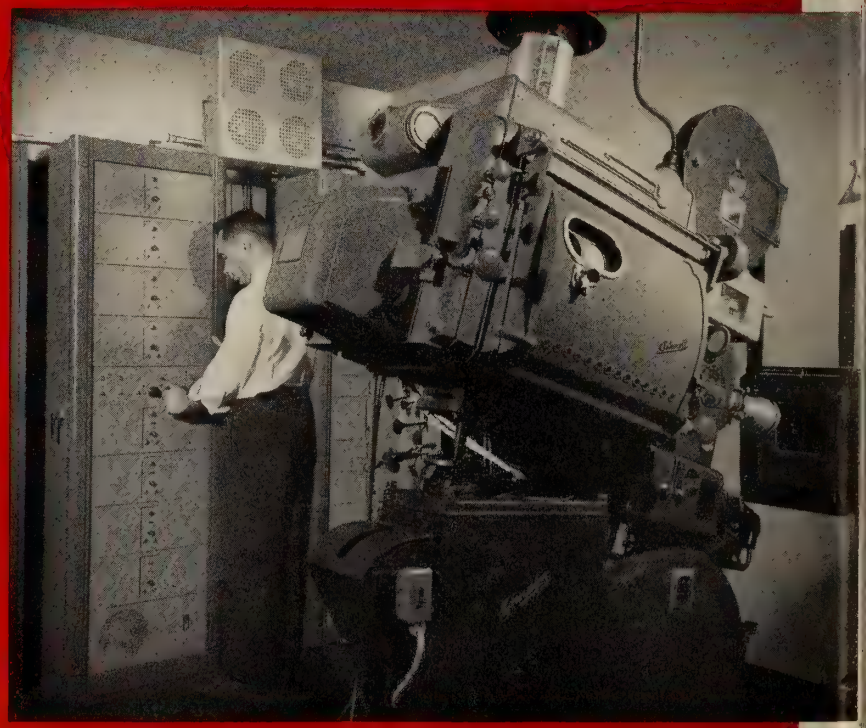
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But no single union — not even the trade union movement itself — can sit back and consider itself secure while an all-out war is being conducted against us on the political and legislative fronts.

The powerful interests opposed to the progress of the trade union movement have succeeded in Congress and in many state legislatures in bringing about the enactment of repressive legislation aimed at destroying the security and the effectiveness of organized labor.

This unhealthy trend must be resisted and overcome by labor at the local, state and national level. There is only one way we can do it — and that is by increased activity in the political field. That is where labor is weakest at the moment. To build up labor's strength politically, it is absolutely necessary for us to organize just as patiently and as indefatigably as we did when we first built up our trade-union structure.

We must get out the labor vote — make sure our members and their families and friends register and go to the polls on election day. We must inform the voters — give them unvarnished facts on the voting records of candidates. We must impress upon our people that politics *is* their business — that they can be hurt just as severely by neglecting their electoral rights and responsibilities as by letting their union go to pieces.

The American Federation of Labor has established a sound political organizing structure. It is called Labor's League for Political Education. All subordinate organizations — including state and local central bodies — have a primary responsibility to cooperate with the League and to help it organize thoroughly.

When we complete this all-important job, I am confident that we will win the critical political tests that lie ahead and once again set the nation on the road to progress.

GEORGE MEANY

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To the men behind the picture . . .

RCA SERVICE COMPANY, INC.
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Camden, New Jersey

Prescription for Good Projection

By BASIL T. WEDMORE

Theatre Systems Engineer, Westrex Corp.

WE ALL try to earn a living in the motion picture business, but we shall continue to do so only if the business is kept alive and healthy by our efforts. Since you are the doctor, let us look at the diseases to which your patient is liable.

The whole technical achievement of telling a story on film must pass through the bottleneck of the release print which is delivered into the projectionist's hands. Then it is up to you to use all your endeavors to obtain the best results, in the interest of the paying audience and yourself.

Prior Print Inspection Needed

The first thing to decide is whether the commercial article, the print itself, is a good one. This is not always easy, even in a first-run house, for if a defect be noticed, it may be only in this print, in every print, or in your own equipment.

Physical damage is easy to detect by close inspection of the print on the rewind bench, but suppose the sound track has been printed too dark, or the print was over-developed in the laboratory? Sometimes the color balance may be off or color fringing quite apparent in the picture on the screen. Only experience will tell us whether the sound or picture quality would be better on another print.

Assuming we have a good print beyond suspicion, let us turn to the equipment first. Let us look at the screen image. Is it in focus? In these days of large pictures, whether an anamorphic lens is in use or not, the focus is more critical than it was before—and for three major reasons:

(1) The magnification of the frame in the projector gate is greater, either in the horizontal direction only as in CinemaScope, or in *both* directions as in "wide-screen," "VistaVision," *etc.* The eyes of the audience are just as critical as they were before, especially near the center of the picture, so the focus must be held more closely.

(2) The focus is more critical in that in a large proportion of our theatres more light *and heat* is now projected than formerly. This is partly due to a general raising of standards over the years, and partly to the requirements of the modern processes.

Critical Focusing A "Must"

(3) Many theatres have fitted to their modern arc-lamps fast and highly corrected lenses for their big picture sizes. These lenses work at a larger aperture (this is the same as a smaller "F" number) than before. While an F:1.8 lens does give a brighter picture than an F:2.2, the depth of focus just *has* to be less and the control a little more critical.

Now ask yourself if your eyesight is quite as good as it was ten years ago. No? So the doctor's eyes are not quite so good and the patient requires more care. We all know the answer to this one, even if we haven't had to apply it in the past. Some projectors are fitted with a little telescope for focusing purposes. If not, a pair of binoculars is a great aid to accuracy, even a low-powered pair will do.

Big Screen Magnifies Shakiness

Now our focus is satisfactory; but what about the steadiness of the picture? It has been rightly said that there are many causes of unsteadiness. A picture which was adequately steady, though perhaps a little underlit, when it was 14 feet, 6 inches by 20 feet may be visibly rocking when it is blown up to 16 feet by 40 feet with plenty of light behind it.

The best tool for checking these faults is the Motion Picture Research Council's 450-foot picture test reel, "VTF", but any 3-D or CinemaScope target film is a great help. "Jump" and "weave" are easy to detect, especially if you sit in the front row of seats occasionally and look honestly for yourself. Incidentally, the use of the new narrow sprockets will not cause either jump or weave. If the sprocket or the shaft be out of "true" or the projector worn, you will get "jump". If the film guides are out of adjustment or the projector worn badly, you will get "weave". This is where you call in the specialist, to help the general practitioner.

Projector and Lens Vibration

Another disease that tends to get worse these days with the "advance of science" is picture movement due to vibration of the projector or the lens. In the days of the old universal base, with small lamp housings and small magazines and lenses, such trouble was rare; but with the motor raised forward and up, the lamphouse backward and up, and possibly a penthouse reproducer on the projector, to say nothing of 25-inch magazines, the story is now different.

Large, slow movements are easy to detect, but a shake of the lens due to the shutter blades being out of balance is hard to detect. It looks like intermittent jump, except that it may be rotary in character on the screen. A job for the specialist again.

Is the picture bright enough and is it easy to hold the illumination even? Let us look at the lamphouse. In order to get the highest efficiency, the makers generally recommend a specific working distance between

the arc and the mirror and the path of the film. These measurements are worked out to catch almost all the light and thread it evenly on the screen without making the arc too critical to operate, and without wasting light and heating the back of the picture gate.

It pays to know the *best* distance between the mirror and the film path, and to employ it. If you need an extra light shield, or to have part of the shield cut away to get the best efficiency, call in the specialist and by all means have it done.

Optical Alignment Check Imperative

In the same way, and this is an old story, it is a good idea to have the optical system dead in line. Otherwise, it is almost impossible to get, and hold, an even light. This too is a job for the specialist, although it can certainly be done by a general practitioner—if he has the tools to do it. The only exception to this rule is that a lens, such as one of the adjustable anamorphics, may be set purposely at an angle to reduce the keystone distortion caused by a steep projection angle.

One more common picture disease, and then we'll turn to the sound. Is the picture free from flicker? Now, some degree of flicker is always present, like the beating of a heart, but like the heartbeat, it should be steady and unnoticeable. The only serious flicker that you *cannot* avoid is when the camera is "panned" or swung (as in some shots we have seen from the cockpit of an airplane or from a moving train).

Common Causes of Flicker

When the projector and shutter adjustments are right, noticeable flicker is generally caused by one of three things.

(1) A single-phase rectifier as an arc supply always gives flicker. If the power line be 50 cycles, this is really bad. It can be cured or reduced, but the cure is generally quite expensive. Three-phase recitifiers, either vacuum-tube or the dry-plate types, are normally perfectly all right in this respect.

(2) The arc flame. Here your practiced eye can tell you what is happening. The flame must look steady. Any variation, whether from too little or too much draft up the chimney, will show on the picture. Any cyclic variation or jump that you can see will show on the screen. A job for the specialist? Perhaps; but first make sure that the draft is not too great and the carbons are good ones. The answer is generally not hard to find. Remember that a noisy arc is a flickering arc, whether the noise is hum or sputter.

Effect of Excessive Screen Brightness

(3) Excessive brightness of the picture on the screen. This can happen easily these days when projecting a standard (1.33:1 aspect ratio) picture onto the center section of a screen set up for CinemaScope or a wide picture. Unless you cut your light intensity, the picture will be above the recommended standards and will show flicker.

If the arc current cannot be reduced sufficiently, a quick remedy is to have a perforated metal grid made up to fit in front of the lamphouse to absorb the extra

(Continued on page 48)

White Screens? Yes-- Within Certain Limits

By LEONARD SATZ
Raytone Screen Corp.

THE writer has always advocated an adequate light source in the projection room for the job that must be done at the screen. It has been proven by SMPTE surveys that the majority of theatres in this country have always operated below the 9- to-14 foot-lamberts which have been set as a standard.

If adequate brightness is to be maintained at the screen, the Motion Picture Research Council tells us by way of a very comprehensive report that for wide-screen projection (not CinemaScope) the light loss will be as great as 48% at the 2:1 aspect ratio. While this light loss is reduced to somewhere between 30 and 38% with a CinemaScope system, the fact remains that a brightness gain on the order of 2 or 3 is required.

Huge Brightness Gain Required

This means that the brightness gain of any screen used for wide-angle or CinemaScope projection should be 200 to 300% greater than a standard white sheet. At the present time, this can only be accomplished with metallic surfaces or by increased light sources—or by a combination of both.

The average theatre using a Suprex projection system at 60 or 70 amperes will find that with a 27- or 28-foot white screen in *new* condition, 10 foot-candles of incident illumination can barely be maintained. This is not a particularly desirable result for a white screen. With CinemaScope, this same white screen would be sorely taxed to give good results at 34 feet.

Eastman Kodak Co. and many Hollywood studios advocate 20- to 25 foot-lamberts for the proper presentation of normal density Technicolor prints. Results will suffer as this foot-lambert reading is reduced.

Manufacturer's Responsibility to Industry

The writer is a screen manufacturer who can furnish regular white or seamless white screens in any size; however, since an obligation exists on the part of such a manufacturer to market a product that will give universally acceptable results, he advocates the use of a good all-purpose metallic screen. More likely than not, exhibitors using white screens will kick themselves when newly-developed 3-D systems will be made available—as they will, the writer does not doubt, in the near future.

If proper light studies are made, and if the results are carefully evaluated, many exhibitors might decide to use white screens. It is hoped, however, that a *generalization* will not be made on the desirability of white screens as against silver screens. It can be very misleading to "follow the leader" because the leader might have had some very special problems and probably accepted a white screen as a rather poor compromise.

★ ★ ★

Greetings

To the I. A. T. S. E.

On The Occasion Of Its 42nd Convention

★ ★ ★ ★

NATIONAL CARBON COMPANY

A DIVISION OF UNION CARBIDE AND CARBON CORPORATION



Finest Lenses Are Needed for New Projection Techniques . . .

THE ANSWER

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Today with the new movie techniques—CinemaScope, Vista-Vision, Wide Screen—exhibitors must have the finest basic lenses in order to give theatre goers sharp, clear pictures from edge to edge of the screen. There are no finer projection lenses made than Wollensak Cinema Raptars. (For CinemaScope these lenses are used with anamorphic lenses.) Cinema Raptars use six and seven element construction. Only with such a design is it possible to deliver full speed, edge-to-edge sharpness, and highest resolution. In addition, Cinema Raptars are the world's only perfectly matched lenses—focal lengths matched to within .0025! Marked as matched (twin) lenses. Speed ranges are f/1.9 in focal lengths from 2″ through 5″ and f/2.0 to f/2.7 in focal lengths to 7″ . . . priced from $180 each.

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JUST PURCHASED NEW PROJECTION LENSES?

NEED ADJUSTMENTS FOR WIDE SCREEN?

WHAT TO DO WITH NON-ANAMORPHIC RELEASES?



With the new Vari-Focus lens exhibitors can show all the current screen releases without buying a complete new range of short focus lenses. The Vari-Focus permits you to make adjustments for screen width . . . change the focal length of your standard projection lens quickly and easily. (See table below.) The Vari-Focus is a supplementary lens which will produce any wide screen aspect ratio (non-anamorphic) when used in conjunction with a 3″ to 6″ projection lens.

The resolution and picture quality will match those of the finest projection lens. Price $235 each.

Standard Lens	Variable Focus From
3″	2¼″ to 1¾″
3½″	2¾″ to 2″
4″	3¼″ to 2¼″
4½″	3½″ to 2½″
5″	4″ to 3″
5½″	4½″ to 3½″
6″	5″ to 3½″

MASTERPIECES of Optical Craftsmanship by **WOLLENSAK**

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Keeping In Step With Progress

By W. L. JONES

Vice-President, Technical Products Service Division

RCA Service Company, Inc.

SOME 28 years ago sound entered the motion picture field. The new "talkies" were eagerly accepted by both patrons and exhibitors alike. Never in view of the paying public, but always responsible for the operation and performance of theatre sound, was that indispensable man — the theatre projectionist.

As new developments in sound and projection were adopted, the projectionist kept pace with the new techniques in theatres across the nation and throughout the world. And with him were the trained field engineers of RCA Service Company. Working together, the projectionist and the RCA field service engineer played a proud role in the success to which theatre sound and projection has risen through the years. Exhibitors know that without the cooperation of these two groups of theatre folk, a tremendous industry may have never developed to its present status.

The small group that began making service calls on theatres more than 25 years ago when the first battery-operated systems were used, has developed into one of the finest service organizations in the country — the Technical Products Department of RCA Service Company. The old-time serviceman, armed with a few simple tools, has become a thing of the past. Today his place has been taken by thoroughly trained experts equipped with the most modern test equipment and tools.

Nation-Wide Engineering Service

The rate of technical development and changes in the motion picture industry has been so rapid that only an organization having properly trained personnel can keep abreast of the developments and keep the field engineers properly informed.

The home office in Camden, N. J. forms the nucleus of RCA's service organization. Through these headquarters, the operation of the company's 11 field offices are coordinated. The strategic location of the district offices makes possible the placing of men and material anywhere in the United States in as short a time as is humanly possible.

At the home office a technical staff prepares and distributes technical information to a nation-wide field force. Keeping in touch with research and design engineers and other outside technical organizations, this group acts as a clearing house for problems submitted by field engineers. Solutions to all problems concerning theatre sound activity is not only sent directly to the engineer requesting it, but is disseminated to everyone in the field force.

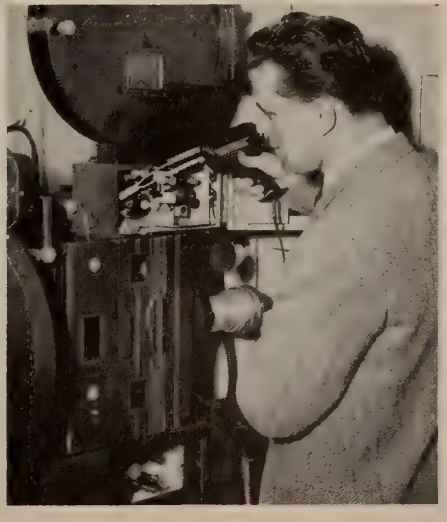
Fully trained and experienced field service engineers and good supervision are a prerequisite for efficient service operation. Field personnel are brought into the home office for additional technical training. Nothing is left to chance, and once a problem is submitted, it is tracked down to its ultimate successful solution.

Strategically Located Field Offices

Responsible for activity in the field are eleven offices across the nation. Field engineers report to district managers in Boston, New York, Philadelphia, Atlanta, Pittsburgh, Cleveland, Chicago, Kansas City, Dallas, San Francisco and Los Angeles. In addition, there are supervisors in the districts and a staff of administrative



Left: From this compact control and monitoring rack, occupying a relatively small amount of space in the projection room, the projectionist operates the instantaneous theatre Tv system, used to present full-sized Tv images on the theatre screen. The optical unit which projects the Tv program is mounted on the front of the balcony.



Right: RCA service techniques keep pace with the latest developments. Shown is a field service engineer degaussing the soundhead used for four-track magnetic sound.

personnel to aid the district manager in utilizing the service activity of each district's engineering complement. Self-sufficient, each district maintains its own supply of parts, and emergency replacements are available at a moments notice.

Field service engineers are assigned a definite territory and this area is covered by a prearranged schedule of service calls. Responsible for the sound equipment in theatres in his territory, the RCA field engineer can be located quickly in event of emergency requirements.

The close contact and association between service engineer and projectionist has resulted in many important improvements in theatre equipment. The application of practical suggestions submitted by projectionists plays an important part in these improvements. The modern sound equipment of today is an outgrowth of some of these suggestions.

Progress in Theatre Sound Reproduction

Since the inception of sound in motion picture theatres, RCA has been a pioneer in technical developments to improve sound recording and reproduction. High Fidelity sound introduced a number of years ago was instrumental in broadening the audio response spectrum which resulted in more life-like sound reproduction. Similarly, the use of ultra-violet light in recording improved the fidelity so that a more faithful sound was obtained in the recording progress as well as in the reproduction process.

In the drive-in theatre field, RCA has constantly been ahead in design of rugged and economically priced equipment. Considerable engineering effort was spent in developing equipment that would be able to withstand the rigors of the elements. In 3-D, the field installation and service personnel worked shoulder to shoulder with the projectionist installing synchronizing equipment, filters, and greatly assisted in the tuning-up of the equipment.

Stereophonic sound which is so widely accepted today by projectionists and exhibitors, was used by RCA customers more than ten years ago when Disney's feature length production "Fantasia" was shown to the public. Music and movie critics alike have stated that stereophonic sound represents the greatest advancement in the motion picture industry since the advent of sound.

When 20th Century-Fox introduced "CinemaScope", again RCA led the industry by producing a 4-track magnetic sound reproducing system, and by installing these equipments in record time. Only the cooperation of the projectionist and sound engineer enabled the industry to meet the opening dates of so many theatres at one time.



E. Stanko (standing) manager, Engineering Section, and P. V. Smith, home office theatre specialist, use an FM audio oscillator to calibrate the RCA-developed flutter meter of the type used by service engineers.

Theatre Television Taken in Stride

The introduction of theatre Tv again found RCA leading the field in this new and impressive development. The mantle of theatre Tv fell naturally on RCA Service Co., for RCA has been a pioneer in television since the early days of its birth.

RCA Service Co. distributed its now famous "Theatre Television Handbook" and introduced the art of big-screen television to the projectionist. This book was prepared primarily with the needs of motion picture projectionists in mind and it also proved of considerable interest to others in the motion picture industry. An impressive volume, it was dedicated to the projectionists of the nation whose successful struggle with the introduction of sound motion pictures left no doubt that they could be relied on to cope equally as well with the new art of theatre television.

Further aiding the projectionists was the close cooperation between RCA Service Co., and the I.A.T.S.E. in the conducting of classes on theatre Tv. A selected group of theatre projectionists were brought into Camden from all over the country for training in the operation of the theatre equipment. The men were instructed by the Service Company's home office specialists, and at the end of the training were well qualified to operate the theatre Tv equipment in their respective theatres.

Supplementing the projectionists were the field members of the Service Company who also received special training on the equipment and its maintenance. The training of the field personnel was accomplished on a rotational basis, and as soon as one group of men completed their course they were returned to their districts and their places taken by another group of service engineers. Some of these engineers were then assigned to special demonstration teams and were active throughout the country in bringing this new entertainment medium to prominence. The extensive home office training plus actual field experience helped put RCA in a leading position in aiding exhibitors at the inauguration of theatre Tv.

Service Assistance to the Projectionist

No one is more conscious of the necessity of proper maintenance and emergency protection for sound equipment than the field service engineer. His daily routine not only centers on maintaining the sound quality, but includes a responsibility for recommending means for achieving the greatest possible insurance against failure. Still his job is not finished until all projectionists have been thoroughly rehearsed and have received a full explanation of the whys and wherefores of the added protective circuits or equipment. This is especially important when so many new circuits for 3-D projection and stereophonic sound have been added.

The field service engineers recommendations for spare

(Continued on page 47)

Greetings to the IA

— and thanks for your signal contribution to the successful operation of precision visual and sound reproducing equipment. Your expert craftsmanship has contributed mightily to the steady progress of Motiograph since its founding in 1896.

Together we can go on to meet the increasingly exacting demands of motion picture presentation.

Remember . . . all projectionists are invited to the Mammoth Theatre Equipment Show October 31 through November 4. Conrad Hilton Hotel — Chicago

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The Carbon Arc:

Vital Twin Factor in Production and Projection

A compendium of engineering and operating data of carbon arc performance on motion picture studio sets and in theatres.

EMOTIONALLY, the characters and the story are the most important factors in motion pictures, but technically the entire subject is based on means of controlling the intensity and color of light. A phrase often heard in projection rooms is, "If the picture isn't on the film, we can't put it on the screen." A corrollary true statement is, "If the light isn't on the motion picture set, you can't put the picture on the film."

A motion picture is largely an appeal to the senses through vision, which is the ability to apprehend light and color. The success of modern cinematography is based upon the ability of the cinematographer to control the intensity and quality of light on the set. If the cinematographer be restricted in the use of proper lighting equipment, his finished product may appear like a skeleton, without flesh and color.

Historically, the use of artifical light in the motion picture industry has followed a number of recurring cycles. The use of various types of lighting equipment has not always been a matter of *evolution.* On several occasions there has been a *revolution* in which carbon arcs were moved down from the top place by incandescent tungsten lamps, and *vice versa.*

Major Influences Upon Lighting Technique

The major influences underlying these cyclic changes, on the production end, were many and varied, and high on the list in importance were the advent of panchromatic film, the arrival of sound-on-film, the application of three-color cinematography, and finally an economic factor which resulted in a major change in the spectral sensitivity of all color films.

On the projection front the demand for more and better screen light has been what may be termed persistently insistent, dating from the time that the exhibition field, slowly at first and then at an accelerated pace, became aware of the direct effect of the quality of the projected screen image upon the box-office. This awareness became acute with the introduction of 3-D pictures, with their concomitant loss of light due to the requisite use of accessory projection and viewing adjuncts; with the mushrooming drive-in theatres with ever-expanding screen area, and then the arrival of the various wide-screen processes.

In modern motion picture photography light from the sun, from the carbon arc, from incandescent tungsten is directed to the object to be photographed. By reflection this light is redirected to the film where it provides a photo-chemical reaction. The film, so modified, acts only as a filter to control the intensity and quality of light from a projector. The modified projected light remaining after it has passed through the film is reflected from the screen to the eyes of the audience, where it again makes an impression which should coincide dramatically with the original action.

Control of Quality, Quantity of Light Vital

It would all be a simple matter of floodlighting if the work "dramatically" did not carry such strong implication. The enhancement of dramatic action requires that the cinematographer have as perfect control of *both* quality and quantity of light as possible.

The advent of modern full-color cinematography brought with it a number of new lighting problems. To visualize them it is only necessary to consider that in black-and-white cinematography light creates film density which is merely a medium to control the intensity of the rays from the projection light source. The audience gains the illusion of a picture by variation of light and shade.

In color, however, it is also necessary to use a light source containing the three primary colors of the spectrum in order to produce color, hues and tints. Because white light is made up of equal quantities of the light primaries (blue, green and red) it has been chosen as the source for professional color cinematography. The use of white light for interiors also simplifies the process because sunlight is white light and the same

Color Cinematography Requisites

film may be used on exteriors as on interiors.

If the projection light source contained no blue, there would be no blue on the screen regardless of the color of the film. The same is true of the light sources used in set lighting. The color is in the light, and the objects serve only to *selectively* reflect the various rays from the light source to the film in the camera.

In black-and-white cinematography the absence of light results in a black image on the screen which in many cases is accepted by the viewer as an intended

shadow. Under adverse conditions a character in a dark suit may appear only as a face, hands and white shirt, with no detail whatever in the suit; still the viewer will accept the result.

The foregoing is not true with color. Here the absence of light is also black; but if a character wearing a dark-colored suit moved into an area where the light level were too low, the suit would appear black, which would not be acceptable to all. The same thing could happen to a colored dress with deep folds where the absence of light in the shadow areas might make it appear as having black stripes.

In the early days of color motion pictures the somewhat lower latitude of the process brought forth some proponents of "flat" lighting. It was their contention that the sets should be illuminated with highly diffused light sources, the differences of intensity reduced to a minimum, and that color itself would provide the necessary depth and contrasts. As a matter of fact, modern color has brought about demands for lighting equipment with *much greater scopes* than was previously dreamed of with black-and-white. Brilliance, volume, color, penetrating power, and controllability have all been vastly improved in modern lighting equipment.

Inasmuch as white light, or sunlight, quality is required for color, the only unfiltered light source to meet completely the requirement is embodied in the carbon arc "broadside" and the "spotlamps," each fulfilling a specific need and supplementing each other.

Modern Movie Lighting Keyed to "Action"

The old adage of "Light for the shadows and let the highlights take care of themselves" is no longer apt. The modern cinematographer lights for the "action," which is most important. He adjusts the "key light," the illumination falling on the face of the principal character, so those reflected rays will make suitable density on the film; then he accurately balances the illumination in the highlight and shadow areas for the artistic effect he wants. His ability to create the desired dramatic illusion is the measure of his worth.

In the entertainment field, standardization of technique often result in formula without novelty, or apparent difference. It is quite true that people want formula, that they will not accept anything which does not carry a familiar connotation. They will pay money to see the same thing they saw last week or last year. They want it to be the same—but they want it to be *differently the same!*

To satisfy this requisite the cinematographer must have absolute freedom of choice for the *improvement of production values* rather than be restricted by the demand for small economic squeezing which robs him of the initiative it takes to make something differently the same.

Early pictures presented sharp contrast in light and shade with little intermittent gradation of tone, and a relatively low level of screen illumination gave satisfactory reproduction. Improved emulsions permit a wide latitude of tone gradation and the perfection of modeling and detail. This, in turn, requires a high level of screen illumination for effective reproduction of this photographic quality on the screen. At dusk one can see the outlines of buildings, trees and other features of the landscape but few of the surface details which are clearly visible in stronger light.

Studio, Projection Lighting Blood Brothers

Projection follows the same rule. A good intensity of screen illumination is needed for the audience to see the full quality and beauty of the photography. A screen brightness of 9 to 14 ft.-lamberts at the center of the screen is specified by the American Standards Association, as recommended by the Society of Motion Picture and Television Engineers. At 75% reflectivity this represents a light intensity of 12 to 19 foot-candles at the center of the screen, or, 80% side-to-center distribution, 10 to 16 average foot-candles over the entire screen area.

Introduction of color in motion picture photography has given importance to the color quality of projection light. 35-mm film for theatre use is processed to give accurate color values on the screen when projected with snow-white light, that is, light in which all primary colors are present at essentially equal intensity as in daylight. Projection light of other quality distorts the colors on the screen and detracts from the impression of reality.

The addition of sound to the motion picture film might seem to have no bearing on projection light requirements, but in reality it does. The frame dimensions of the picture on sound film have been reduced from those of silent film to provide a marginal space for the sound track or tracks. As a result, with the same optical factors used for silent pictures, a light source of 24% greater brilliancy is needed to project the same volume of light through the aperture and film and produce a screen image of equal area and brilliancy.

Some Recent Advances in Projection Systems

Recent years have seen important new developments in all aspects of motion picture projection systems. Hitex* 13.6-mm super high-intensity carbons were introduced in 1949 for use in rotating-carbon, condenser-type lamps at 170-180 amperes.

Introduced about a year and a half ago was a new 13.6-mm standard high-intensity carbon to replace the former one used in condenser-type lamps at 125-150 amperes. A new Suprex* 9-mm positive carbon has extended the range and output of the non-rotating carbon, reflector-type lamp used with copper-coated, non-rotating carbons. A new Suprex 7-mm positive has made possible increases in efficiency and light output compared with Suprex 7-mm carbons formerly used. New high-speed, reflector-type lamps employing rotating 9-, 10-, and 11-mm positive carbons have been marketed and are finding wide usage.

In addition to these combinations already in commercial usage, National Carbon Co. has developed several new carbons specifically to meet the demands of the new projection systems. These include the new Hitex 10-mm carbons for rotating-type reflector lamps; and the new Ultrex* 10-, 11-, and 13.6-mm carbons which are most effective when used with adequate water-cooling in rotating-reflector as well as condenser-type

* The terms "Hitex," "Ultrex" and "Suprex" are trade-marks of Union Carbide and Carbon Corp.

SCREEN ILLUMINATION WITH CARBON-ARC MOTION PICTURE FILM PROJECTION SYSTEMS: BASED ON THE STANDARD 0.600 X 0.825-INCH APERTURE

CARBONS		Arc		Lamp optical sys.	80% dist.		Max. light[3]		Approx. carbon consump. rate, in./hr	
Positive	Negative				Screen lumens[1]	% dist.[2]	Screen lumens[1]	% dist.		
Type	Type	amp	volts						Pos.	Neg.
Non-Rotating, Reflector-Type Lamps—"One Kilowatt" d-c Trim										
7-mm × 12 or 14 in. Suprex	6-mm × 9 in. Orotip C	40	27.5	11⅜ in. dia *f*/2.5 mirror	5,900	80	6,500	65	5.8	3.4
Non-Rotating High-Intensity Trims										
7-mm × 12 or 14 in. New Suprex	6-mm × 9 in. Orotip C	42	36	14 in. dia *f*/2.3 mirror	7,250	80	8,650	60	7.6	3.8
7-mm × 12 or 14 in. New Suprex	6-mm × 9 in. Orotip C	46	38	14 in. dia *f*/2.3 mirror	8,150	80	10,000	60	9.3	4.0
7-mm × 12 or 14 in. New Suprex	6-mm × 9 in. Orotip C	50	40	14 in. dia *f*/2.3 mirror	9,200	80	11,700	60	11.6	4.3
8-mm × 12 or 14 in. Suprex	7-mm × 9 in. Orotip C	60	36	14 in. dia *f*/2.3 mirror	10,300	80	11,000	65	9.0	3.8
8-mm × 12 or 14 in. Suprex	7-mm × 9 in. Orotip C	65	38	14 in. dia *f*/2.3 mirror	11,800	80	12,700	65	11.8	4.0
8-mm × 12 or 14 in. Suprex	7-mm × 9 in. Orotip C	70	40	14 in. dia *f*/2.3 mirror	13,000	80	14,000	65	15.0	4.3
9-mm × 14 in. Suprex	8-mm × 9 in. Orotip C	65	41	14 in. dia *f*/2.3 mirror	12,300	80	13,000	70	10.5	3.3
9-mm × 14 in. Suprex	8-mm × 9 in. Orotip C	75	45	14 in. dia *f*/2.3 mirror	13,800	80	15,000	70	15.5	3.8
Rotating, Reflector-Type Lamps										
9-mm × 20 in. High-Intensity	5/16 × 9 in. Orotip	75	52	16–16½ in. dia *f*/1.9 mirror	13,000	80	16,000	60	14.0	3.3
9-mm × 20 in. High-Intensity	5/16 × 9 in. Orotip	85	58	16–16½ in. dia *f*/1.9 mirror	15,000	80	19,500	55	22.0	3.5
10-mm × 20 in. High-Intensity	11/32 × 9 in. Orotip	100	60	16–16½ in. dia *f*/1.9 mirror	16,000	80	20,000	60	20.0	3.0
11-mm × 20 in. High-Intensity	⅜ × 9 in. Orotip	120	65	16–16½ in. dia *f*/1.9 mirror	(20,000)	80	(23,000)	65	20.0	2.7
10-mm × 20 in. Hitex	7/16 × 9 in. Orotip	125	64	16–16½ in. dia *f*/1.9 mirror			24,000	65	19.5	2.4
10-mm × 20 in. Hitex	7/16 × 9 in. Orotip	130	66	16–16½ in. dia *f*/1.9 mirror	(21,000)	80	25,500	65	25	2.6
10-mm × 20 in. Hitex	7/16 × 9 in. Orotip	135	70	16–16½ in. dia *f*/1.9 mirror			26,500	65	32	1.7
10-mm Ultrex[4] Experimental	Experimental	165	80	Exper. *f*/2.0 mirror			(34,000)	(60)	45	
11-mm Ultrex[4] Experimental	Experimental	195	80	Exper. *f*/2.0 mirror	(28,000)	80	(35,000)	(65)	45	
Rotating, Condenser-Type Lamps										
13.6-mm × 22 in. New High-Intensity	7/16 × 9 in. Orotip	125	68	Condenser lenses at *f*/2.0	11,500	80	14,500	60	7.25	2.4
13.6-mm × 22 in. New High-Intensity	½ × 9 in. Orotip	150	74	Condenser lenses at *f*/2.0	16,000	80	19,500	60	14.0	1.9
13.6-mm × 22 in. New High-Intensity	½ × 9 in. Orotip	160	77	Condenser lenses at *f*/2.0	(16,500)	80	20,500	60	17.5	2.1
13.6-mm × 22 in. Hitex Super	½ × 9 in. Orotip Heavy Duty	170	70	Condenser lenses at *f*/2.0	17,500	80	20,700	60	16.0	2.3
13.6-mm × 22 in. Hitex Super	½ × 9 in. Orotip Heavy Duty	180	74	Condenser lenses at *f*/2.0	19,300	80	24,800	60	21.5	2.5
13.6-mm × 22 in. Ultrex[4] Experimental	Experimental	265		Condenser lenses at *f*/2.0	(26,000)	80	(28,000)	(60)		
13.6-mm × 22 in. Ultrex[4] Experimental	Experimental	290	80	Condenser lenses at *f*/2.0	(30,000)	80	(34,000)	(60)	45	

NOTE: Values in parentheses are estimated or obtained from limited measurements.

[1] Screen lumen figure is for systems with no shutter, film or filters of any kind; measured with 5-in. E.F. *f*/2.0 and *f*/1.9 projection lenses.

[2] % distribution refers to ratio of light intensity at side of screen to that at the center.

[3] Maximum light is value with system adjusted to produce maximum light intensity at the center of the screen.

[4] Experimental carbons burned with short protrusion in experimental water-cooled silver jaws.

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lamps. While Ultrex carbons have not been marketed yet, they will be available when suitable lamps are announced.

Carbon Combinations, Light Levels, Distribution

Figure 1 shows maximum screen lumens at different arc currents for various lamp and carbon combinations with no film, shutter or filters. Values of screen lumens obtained with the lamps and optical systems adjusted to produce 80% side-to-center distribution ratio are not shown, but they generally fall 10 to 25% below the maximum values. Fig. 1 shows that the rotating-type reflector and condenser lamps are capable of projecting more than 20,000 lumens with *standard* carbons, and more than 30,000 lumens with suitable *experimental* carbons.

In some cases, these lamps can project more light and heat onto the film than can be accommodated without some suitable cooling means. This article does not specify means of protecting the film from high levels of radiant energy flux; it points out, however, that the use of infra-red absorbing filters, infra-red reflecting filters, controlled air-blast, and the use of a water-cooled film gate have all been asserted to provide some protection to the film.

Such protective means may require the sacrifice of a small portion of the screen light and will correspondingly change the lumen values of Fig. 1.

Screen Widths and Light Levels

The light requirements of the new projection systems may be analyzed in correlation with these latest developments, beginning with a restatement of the American Standards Association *indoor* theatre standards, which recommends a screen brightness of 9 to 14-foot lamberts with the projector running and no film in the gate.

The data of Fig. 1 have been used to calculate the

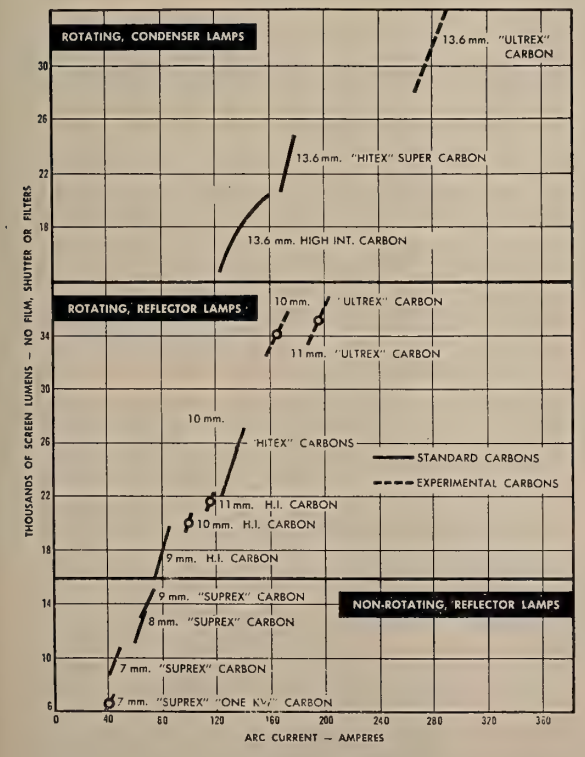


FIG. 1. Maximum screen light *vs.* arc current.

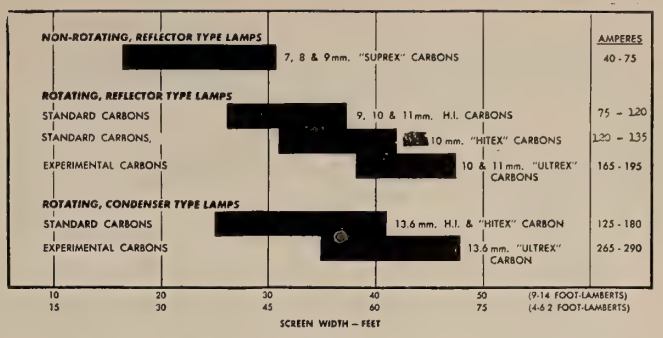


FIG. 2. Size of screens capable of illumination to indicated screen brightness at the center of the screen. [Based on maximum light, 50% shutter transmission, 90% projection port transmission, 75% screen reflection factor, and a 4 x 3 picture aspect ratio.]

widths of screens which can be illuminated to the aforementioned ASA standards, with a projection shutter of 50% transmission, a projection room port glass of 90% transmission, and a projection screen of 75% reflection factor.

The resultant screen widths are shown in Fig. 2. The lower ends of the screen width ranges shown in Fig. 2 belong to the smaller and lower power carbon trims and to the *maximum* recommended screen brightness; while the larger screen widths pertain to the larger and higher power combinations and to the *minimum* recommended screen brightness.

No allowance has been made for light losses that may occur with heat filters which may be needed under some conditions to prevent heat-on-film troubles. The data on Fig. 2 will be correspondingly altered in case there are any additional light losses beyond those assumed. For example, a 10% loss in light will reduce the indicated screen widths about 5%.

Outdoor Theatres Pose Difficult Problem

Reference to Fig. 2 shows that Suprex carbon trims are capable of illuminating screens approximately 16 to 30 feet wide at maximum light. Rotating-type reflector lamps increase these screen widths from 26 to 37 feet with standard carbons. Generally speaking, the rotating-type condenser lamps are capable of illuminating about the same width screens as the rotating-type reflector lamps.

The foregoing discussion shows that present difficulty of lighting screens of 50 to 70 feet width, common in outdoor theatres, to the standard of 9 to 14 foot-lamberts applicable to indoor theatres. However, the screen brightness requirements of outdoor theatres are not as precisely known as are those for indoor theatres, because of the widely variable physical conditions. Just what level of screen illumination can be obtained on these large screens depends upon the maximum amount of light obtained from the projection system.

Increasing the indicated screen width by 50%, *without changing the present standard ratio of height to width,* corresponds to a screen area 2.25 times greater. Such a screen can be illuminated by the combinations of Fig. 1 to a center brightness of 4 to 6.2 foot-lamberts. These screen brightness limits have been chosen *not* because

(Continued on page 47)

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Flexibility Marks Modern Arclamps

By ARTHUR J. HATCH
The Strong Electric Corporation

GENERALLY SPEAKING, if the historical development of a class of devices is studied, it is found that as the flexibility of the device is increased a compromise in quality, efficiency, or operational ease is necessary so that the flexibility goal can be achieved. This has not been so, however, in the instance of the Strong Mighty 90 and Super 135 projection arc lamps, whose range of flexibility has been increased in many ways without compromising with quality.

As an example, in the low-intensity lamp the range of carbon burning rates from the highest value to the lowest value was approximately a 1.3:1 ratio. The Suprex type of arc had a burning rate range of 1.75:1; while the 1 Kw type of lamp had no range whatever, since it had to burn at the one fixed current for which it was designed.

Wide Flexibility in Light Level

The Strong Mighty 90 and Super 135, however, have an overall carbon burning rate range ratio of 2.5:1. Converting this to inches of carbon per hour, this means that these new type lamps are capable of burning as slow as 13 inches or as fast as 32 inches of carbon *per hour*. Correspondingly, the arc current range of the Mighty 90 and Super 135 is 1.8:1 as compared with a 1:1 ratio in the instance of the 1 Kw.

In addition to the flexibility in burning rates, there is of course a corresponding flexibility in the amount of light that can be produced by the Strong Mighty 90 and the Super 135. From the lowest to the highest light level there is a range of 1.7:1 ratio; whereas in the Suprex the ratio runs 1.55:1; while the 1 Kw, with its fixed burning rate, had a fixed light output. The low-intensity lamp, due to the fact that the intensity of the crater remains approximately the same through quite a range of carbon sizes and currents, has a light range ratio of only 1.2:1.

Most low-intensity lamps were capable of burning only two sizes of carbon trims; the 1 Kw lamp was capable of burning only one type of carbon trim; and the Suprex permitted the choice of three carbon trims. The Strong Mighty 90 and Super 135 afford a choice of four different and distinct carbon trims. As to the various modes of burning the carbons, the low-intensity, 1 Kw, and the Suprex could burn the various carbons in only as many fashions as there were variations in trim. The Strong Mighty 90 and Super 135 can burn the four carbon trims in a total of seven separate manners. Three of these four trims can be burned in a manner so as to be consumed either in the range of 30 to 55, or 45 to 75 minutes per positive carbon. This versatility affords the theatre owner and projectionist an opportunity to attain any desired degree of cost of operation, screen illumination, or burning time — a

TABLE 1. Data relative to lumen output at given arc amperage and voltage for Strong projection arclamps.

RANGE OF TOTAL SCREEN LUMENS: NO SHUTTER, NO FILTER, F:2 COATED LENS (See notes 1, 2, and 3 below)	ARC AMPERAGE RANGE	ARC VOLTAGE RANGE	RANGE OF CONTINUOUS BURNING TIME WITHOUT RETRIM (In minutes)	CARBON		GEAR REDUCTION POSITIVE MOTOR	POSITIVE CARBON DRIVE ROLLER ASSEMBLY	NEGATIVE LEAD SCREW THREAD	POSITIVE CONTACTS
				POSITIVE	NEGATIVE				
15,000—19,000	75—85	50—55	75 to 45	9 mm	5/16	300:1	9—10 mm	5	9 mm
17,000—21,000	82—90	53—60	55 to 30	9 mm	5/16 11/32 — above 85 amps.	216:1	9—10 mm	5	9 mm
16,000—19,500	90—100	55—62	75 to 45	10 mm	11/32	300:1	9-10 mm	5	10 mm
18,000--21,500	97—105	60—64	55 to 30	10 mm	11/32	216:1	9—10 mm	5	10 mm
18,500—22,500	110—120	60—65	75 to 45	11 mm	3/8	300:1	11 mm	6¼	11 mm
19,000—22,500	115—127	57—65	75 to 45	10 mm Hitex	3/8	300:1	9—10 mm	6¼	10 mm
22,000—26,000	124—135	63—70	55 to 30	10 mm Hitex	7/16	216:1	9—10 mm	6¼	10 mm

NOTES: 1—Total lumens through 2.55:1 ratio aperture of standard width: 50% less; 2—through 2:1 ratio aperture of standard width: 30% less; 3—through CinemaScope aperture: approximately 22% more.

flexibility which had long been desired but never attained with previous types of lamps.

The accompanying chart (Table I) illustrates the flexibility of these modern lamps and shows the few simple changes needed to cover the range of operation.

Control Settings Enormously Simplified

As stated previously, these increases in flexibility have not compromised the ease of operation of these new Strong Lamps. As a matter of fact, the control settings necessary to attain the various adjustments through the increased range have been simplified. Only one control is required for selecting any amperage within the range of the particular mode of operation. While the 1 Kw and low-intensity had only one control, the burning range was strictly limited to 1.1 and 1.3:1 ratio. Although the Suprex lamps afforded a comparatively wide burning rate ratio, the operation was complicated by the necessity of adjusting two separate carbon feed rate controls.

This simplification of control was made possible by Strong's development of a bimetal control tube. This Lightronic tube controls the carbon feeding rates so as to automatically hold the carbon crater at the *exact* focal point of the reflector at *all* times. By this control of the positive and negative motor feed speeds the arc can be burned without constant attention by the operator.

Unique Simplification of Controls

With the new screen presentation techniques further complicating the job of the projectionist, he has been particularly appreciative of the simplified control of these new Strong lamps. The projectionist, furthermore, is quick to see the advantages of the unitized component design which affords such wide versatility in these lamps. He can in a matter of moments and right in his projection room effect the simple changes necessary to attain the correct light requirement for any of the various screen presentation techniques. It is even possible for him to quickly and easily obtain the light requirements for two different types of techniques on the same program, even though there is a 60% difference between their light requirements.

Simultaneously with the widening in the flexibility of operation of these new arc lamps, Strong also designed rectifiers of correspondingly increased range. For example, the new Strong selenium rectifier has a range of from 90 to 135 amperes, which means that with a single piece of power conversion equipment the projectionist can fulfill the arc power requirements of the various systems of screen presentation.

★ ★ ★

The Future of Theatre Tv

By NATHAN L. HALPERN
Theatre Network Television, Inc.

IT seems strange that the motion picture industry, painfully aware of the inroads upon its audience, has been slow to seize upon a simple method of turning the techniques of television to its own advantage and profit. This could be accomplished if more thought were devoted to the vast and unexplored possibilities of theatre Tv.

In the last five years, Theatre Network Television has presented 69 closed-circuit telecasts of sporting and other events, but even now, despite the great success of the Rocky Marciano-Ezzard Charles heavyweight championship fight telecast, there still are theatre men who do not understand the possibilities of closed-circuit television.

Cost Factor Vital for Network Tv

Tv network executives fret over the tremendous cost of putting on quality shows without some method of easing the burden on advertisers by charging the listener a fee or some kind of "admission" charge. Closed-circuit theatre Tv can solve this problem for many types of shows and also put the motion picture exhibitor in a position to acquire new box-office revenue. It may be that the customer must leave his home in order to view a theatre Tv event, but it is also true that a much larger and more dramatic picture can be presented in the theatre than on the face of a comparatively small Tv tube.

Furthermore, there is another use to which theatre Tv circuits and equipment can be put, offering a new and almost untouched field for the motion picture theatre. This is the practice of connecting sales meetings, conventions and similar gatherings at distant points by means of closed-circuit Tv, rather than by the customary but time-consuming and expensive process of gathering the interested parties from all over the country. This is what we call "Tele-Sessions."

"Tele-Sessions" in a Phenominal Spurt

An outstanding example of how Tele-Sessions can make wide use of theatre Tv equipment and motion picture auditoriums on a nation-wide basis is the coast-to-coast sales meeting that we recently organized for the Dodge Division of the Chrysler Corp. Dodge dealers and salesmen in 29 cities were given a preview of the 1954 sales and advertising campaign. This program originated from television studios in New York and featured top Dodge executives in addition to Tv and radio personalities sponsored by the company.

Another very successful telecast of this type was sponsored by National Dairy Products Co. This firm reasoned that if Tv was effective in selling customers on its product in the home, closed-circuit Tv in the theatre, aimed solely at its dealers and routemen, would be effective in selling them on the company's product.

Produced by the Tele-Sessions division of TNT, this program originated in the Center Theatre in New York City and was piped to selected theatres in all Sealtest markets. It was a 1¾-hours show which started at 10 A.M., used 12 sets and required about 100 crewmen and 50 performers.

Soaring Craft Employment Possibility

Tele-Sessions is a fast-growing business that can provide increased revenue for the motion picture theatre, help keep theatres open and increase job hours for projectionists and other technicians. This union (the IATSE) and its membership has always shown an awareness of the potential importance of theatre Tv, and their

(Continued on page 46)

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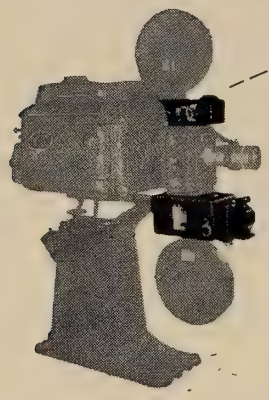
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EASTMAN KODAK COMPANY

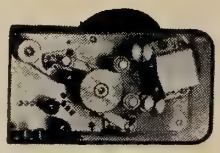
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Westrex Corporation announces for the Stereophonic Era

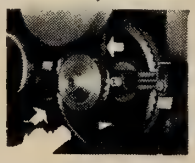
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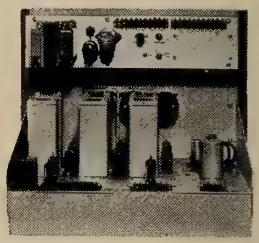


R9 Stereophonic Reproducer (Magnetic) features the Academy Award winning hydro flutter suppressor, a tight film loop, and double flywheels.



R7 Photographic Reproducer assures the best reproduction from variable area and density prints. Special noiseless timing belts that neither slip nor stretch are featured for the first time.

FOR THEATRES OUTSIDE U. S. A. AND CANADA



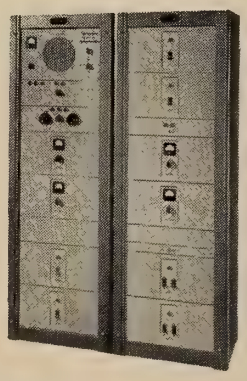
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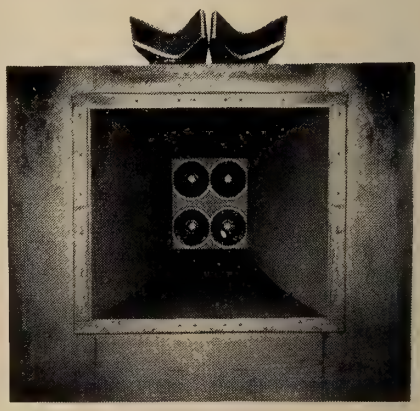
Westrex offers a complete line of newly designed theatre sound systems for multi-channel magnetic (such as Cinema-Scope), multi-channel photographic (such as Perspecta Sound), and single channel reproduction (standard photographic). When installed and serviced by Westrex engineers, these systems assure the finest performance at the lowest overall cost.



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VistaVision: Basis for a World-Wide Standard of Presentation

By LOREN L. RYDER

Head of Engineering and Recording Paramount Studios, Hollywood

ONE can always measure a projection throw, but how far can one throw a projectionist? Let a small framing error exist, allow a few frames to run out of focus, or miss a changeover—and the projectionist is a bum. Yet, have a complete run-through with everything in perfect balance and the projectionist hardly gets a nod. So it is behind the scenes.

Actually, projection room operation is so important that no motion picture performance could be completely successful without the talent and experience of today's projectionist. Beset as some of them have been with a multiplicity of new methods, and having been confronted with problems like 3-D, stereophonic sound, various aspect ratios and the like, it is a wonder that they keep their sanity.

World-Wide Theatre Survey Underway

But projectionists almost everywhere take particular pride in their work, their equipment and its performance. This came especially to my notice during a recent tour of theatres in Europe and Canada where, as in the United States, they take equal pride. In theatre areas in Germany as well as Italy and, to some extent, in Belgium where there has been much rebuilding since the war, projection rooms are most modern and provide fine operation facilities. The greater part of the equipment has been patterned after our own and it is well made by fine craftsmen.

Paramount is now in the process of making a world-wide survey of theatres, and in addition to my trip throughout Europe, my assistant at the studio, Louis H. Mesenkop, is in the Orient, while Frank La Grande of the New York office is checking the South American territory. In each case it is found that the majority of projectionists have great respect for their positions. This is gratifying and indicates a sincere effort to provide the best possible picture presentation.

With the knowledge that we are part of a world-wide entertainment activity, and since a good percentage of revenue is derived from foreign showings, it is important that we understand and assist wherever we can to keep our product playing well, since this extra revenue makes it possible to continue making the high quality pictures exhibited in domestic theatres.

In my travels in the United States, Canada and Europe, wherein I am working for large-screen presentation, I have oddly enough found many theatres in which we have more difficulty getting sufficient width than height. There are a great many narrow houses where proscenium width is sharply limited, while interior height is ample. This form accommodates the standard picture very well. It does present some problem however, in adapting for a wide-screen showing.



The principle of VistaVision is illustrated here. The human eye, everyone agrees, is constructed in such a way that its sharpest resolving power can be focused only on a relatively small area of direct interest. The eye also sees with considerable clarity a surrounding area of comfortable viewing. Anything outside this area is in the realm of what we see when we say "seen out of the corner of the eye."

Simplification, Standardization the Goal

At Paramount we are putting a great deal of effort behind a program to simplify and standardize on a flexible basis the systems of picture making and picture presentation. To this end our VistaVision process is offered to meet the requirement of theatres large and small as well as those of limited width and limited height.

The first VistaVision-produced picture will not be introduced until sometime in October, but meanwhile, as a point of information, I should like to leave a few impressions as to the benefits that may be expected by the exhibitor. Of singular importance, it represents no special problem for the projectionist.

Any standard equipment that is normal for usual runnings can handle VistaVision prints since regular 35-mm release film with standard optical soundtrack will be supplied. Where a large screen has been installed it will be necessary to secure a different focal length lens. Otherwise, if sufficient light output is available, any theatre can present a clear, sharp image with such exceptional depth of field that any seat in the house will be acceptable. For general use, that about sums it up.

It might bear repeating, however, that the source of the VistaVision picture in this new form is from exposing

an 8-sprocket hole negative *horizontally* along the film. This bigger negative with more detail than could be photographed on the standard 35-mm size carries the same detail through reduction to release-print size and in doing so practically eliminates the annoying grain that characterizes most large screen blowups.

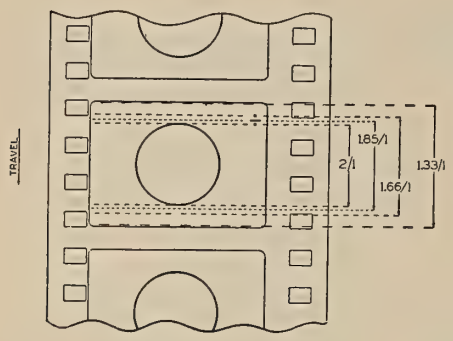


FIG. 3. VistaVision standard release print, showing the various aspect ratios from 1.33 to 1 to 2 to 1.

Incidentally, the surveys being made by the writer in the United States, Canada and Europe, as well as those being made in the Orient and South America, tend to serve another purpose. In addition to the knowledge gained as to foreign equipment, theatres and other problems, we are setting up actual demonstrations of VistaVision to acquaint our world neighbors with the practical possibilities of providing better motion picture presentation to audiences everywhere. A number of showings have already been made around the United States and a great many fine comments have come to us, especially from projectionists who appreciate the simplicity with which VistaVision films can be shown.

Good Presentation Equipment a 'Must'

Our program is designed to give the exhibitor and the projectionists all the knowledge we can accumulate with respect to presenting all picture products to the best advantage. No demands are made on any exhibitor, but we feel that to get the best results, theatres should have good equipment including good projection lenses, ample light and good seamless screens that are *both* high and wide. While forthcoming Paramount pictures can be exhibited in any aspect ration from 1.33 to 1 through 2 to 1, we strongly recommend a ratio of 1.85 to 1 for the best viewing.

Visiting in Los Angeles recently, and after viewing a demonstration of Vista Vision, Mr. Eric A. Pettersson, president of the Swedish Motion Picture Exhibitors Association, said: "VistaVision is the screen presentation process best suited to all the theatres of Europe," and added: "At the exhibitor conference in Paris on May 22-24, we had demonstrations of various aspect ratios and the consensus was heavily in favor of the 1:85 to 1 ratio. This is the picture shape which Paramount recommends and is using on all productions."

During the same week, Mr. Norman B. Rydge, head of the Greater Union Theatres of Australia, declared, "VistaVision is the finest picture I have ever seen on any screen, anytime, anywhere."

As VistaVision goes abroad, Paramount feels that it is making a substantial contribution to better presentation of the mightiest of entertainment values, the motion picture.



Full-size reproduction of the 35-mm release print made from the double-frame VistaVision negative. Latter is turned 90 degrees and printed down to area shown. Resultant print gives greater resolution.

★ ★ ★

Metal Reflectors Meet Exacting Requirements

By E. B. HEYER
Heyer-Shultz, Inc.

NOT so long ago the projection reflector was a problem only to the larger theatres and drive-ins, wherein breakage from excess heat was not only a threat to efficient performance but was uneconomical. To-day, however, more than half the theatres and practically all the drive-ins are faced with this heat breakage of their back-silvered reflectors. Wider and larger screens call for more light, and inasmuch as light and heat travel pretty much together, this means more heat with the extra light produced by the larger carbon trims.

The H-S metal reflector, introduced to the trade in 1934, is today's answer to this problem. It cannot break, will not pit, tarnish or peal, and, because of the five-year guarantee, it is economical. Projectionists find great satisfaction in its dependability, in the knowledge that this reflector will never break and let the show down.

Performance Characteristics Cited

As for "delivered screen light," in laboratory and field tests between the metal reflector and the back-silvered type of reflector, we found that the H-S "52" aluminized metal reflector rates 100%, a "selected" back-silvered reflector 97%, and the H-S rhodium metal reflector 85%.

In addition to its dependability and economy, this metal reflector faithfully reproduces on the screen the white light of the arc crater and maintains this high-quality light year in and year out. H-S metal reflectors that have been in constant use for more than 15 years are still performing efficiently.

Over a long period of time the metal reflective surface does become scratched from constant cleaning, however, and many of these older reflectors have been returned to the manufacturer for rehabilitation. In most instances

(Continued on page 46)

We who have been priviledged for so many years to serve the projection craft with fine optics extend cordial

Greetings

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Fine optics require fine craftsmanship—in the making and using. This combination of skill in the making and using of a precision instrument is a guarantee of mutual progress.

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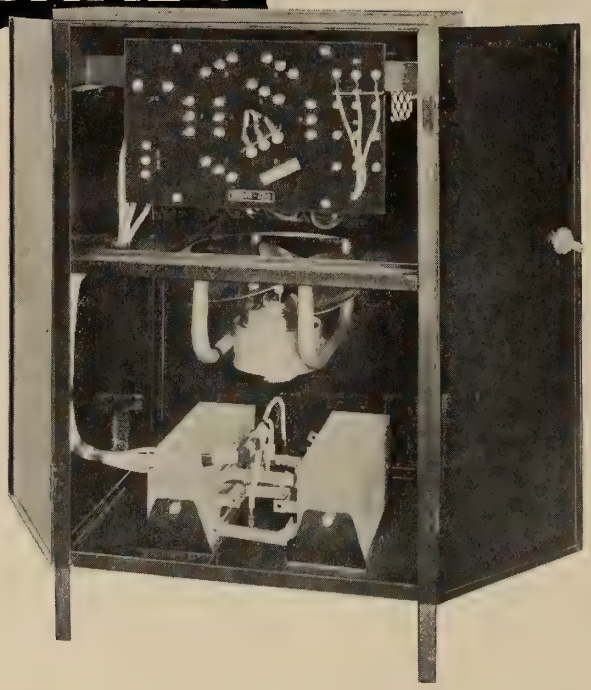
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Robin-Arc Rectifiers are of the high-reactance type, engineered for wide screen and 3-D systems. They reduce damage to carbon craters when striking the arc, and eliminate sputtering which causes pitted mirrors. Conservative ratings assure long life and freedom from trouble. Designed by pioneers in the motion picture field to give you dependable, efficient, uniform D.C. power. Immediate delivery

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Some Questions Answered About —

Magnetic Sound Reproduction

WILLIAM BORBERG
Chief Mechanical Design Engineer

A. A. LEONARD
Applications Engineering Supervisor

General Precision Laboratory, Inc., Pleasantville, N. Y.

TESTS SHOW that the present four-track head will improve in response, and therefore in performance, during the first 100 hours of use. The performance will be nearly uniform between 100 and 700 hours. Three and three quarter million feet of film, or more, or over 700 hours of life, can be expected. Head wear will then be observed to affect one of the four tracks, most likely track No. 2, and this sound channel will deteriorate in a few hours completely.

Thus, a worn pickup head does not cause a sudden breakdown of the show, and since warning is given, replacement can be made in time. This circumstance has been experienced both in our laboratory and in theatres under actual operating conditions.

It is true that improper head adjustment can result in a drastic reduction in head life. However, as maintenance personnel have become more familiar with the criteria for proper adjustment, this factor has lost the importance it had when magnetic sound was first introduced in the theatre.

Filings, Emery and Abrasives

The sound tracks in a magnetic system consist of carefully compounded, purified, and oriented oxides of iron, supported and cemented to the film base by special adhesives. Probably the compound most nearly like that of the soundtrack is known to industry in general as "rouge." This is a material used to obtain the excellent surfaces and high polish we expect in our projection lenses. It certainly *does not* scratch.

Emery is a fine-grained impure variety of corrundum mixed with other minerals, chiefly magnetite."[1] No aluminum oxide or corrundum will be found in the soundtrack. Further, inspection of a head after use will show that the pole shoes are highly polished, usually with a better polish than the original one.

Dust, always present, contributes greatly to wear. The film moving at 1½ feet per second may also become charged and may atract dust particles. Certainly dust causes a great deal of wear. E. W. Franck, of Reeves Soundcraft Corp., makes the following statement:[2] (Journal of the S.M.P.T.E., April 1953, p. 506)

"I think it would clarify the thinking somewhat if we think of head wear as not being caused by the coating but by the dirt, the abrasive dust which is picked up. The film base iself does considerable wearing for this reason—it picks up a lot of dust and dirt. Some types of coatings will pick up more dust or dirt than others and hance wear the head more; but it is the dirt, more than the film base and more than the coatings, which does the damage."

Sprocket Characteristics, Performance

Four-track magnetic sound sprockets do have narrow teeth. This is not their only difference from the previous standard. For a long time it was felt necessary to maintain a tooth spacing to accommodate film shrinkage over a wide range. Modern film base does no shrink as much as the older types, therefore the diameter of the new sprockets has been increasd slightly to permit the pitch or spacing of the teeth to be increased. This results in the teeth entering and leaving the film perforations with less rubbing or "picking."

Tests have been run, and proof is available, that film with standard perforations run on new narrow-tooth sprockets will outlast standard film on old sprockets. Of course, the old wide-tooth sprockets could be increased in diameter, too, but the change to the narrow tooth and greater diameter gives essentially the same increase in film life. We refer to the statement by Dr. E. K. Carver, Eastman-Kodak:[3]

"In the very beginning, I believe that 20th-Fox realized that any new sprockets they made would have to run at least as well on film with standard perforations as the old sprockets. It turns out that if you do not increase the diameter of the sprockets, you get slightly worse results; but if you use an intermittent sprocket with a diameter of 0.953 inches, you get at least five times as good results as far as wear and tear on the film goes as you would with a 0.935 sprocket. You also get better results than if you use a 0.943 sprocket, which incidentally, is an ASA standard. The 0.953 sprocket more than compensates for any decrease in wear you might get with the narrower teeth."

Magnetic Fields Damage Soundtracks

A projector containing magnetized parts will certainly introduce some peculiar and most annoying sounds which may become a permanent part of the soundtrack. It is not difficult to de-magnetize a projector, and once de-magnetized it will stay de-magnetized unless someone places a magnet in contact with it. The de-magnetizing technique was not thoroughly understood when magnetic

sound was first introduced, and some fantastic stories, not founded wholly on fact, have been built up.

The truth is that a mechanism, sufficiently de-magnetized, will *stay* that way. No magnetic disturbances will occur. Film may be handled in the usual manner, and it may be wound and stored on steel reels without harm. Of course, it could be damaged by draping it over magnetized objects, but this will also damage it from a dirt standpoint. We assume that no projectionist would so mishandle film.

The only mechanical damage to magnetic soundtracks that has been reliably reported to us has been caused by rough surfaces, or projecting burrs, plowing grooves into the track. This would also have caused damage to film with optical sound track. Tracks 1, 2 and 3 are 0.013 inch wider than the pole-shoes of the reproducing head; track 4, however, is narrower than its pole-shoe. The type of grooving that might conceivably be caused by this unequal width of track and head has simply not been observed.

Film Stresses Not "Excessive"

The belief that the film is under excessive tension due to the penthouse reproducer is not true. The normal tension on the film between feed sprocket and upper magazine varies from about 1 to 4 ouncs, this variation being caused by the changing amount of film on the upper reel.

When the film is threaded through the penthouse reproducer, the pulling force is increased by 1 or 2 ounces. The total tension is negligible in terms of film wear as compared with tension up to 20 ounces or more caused by some types of takeup mechanism.

Soundtrack Life and Performance

It is recognized that the performance of magnetic sound on 35-mm film is superior to photographic sound in frequency response as well as in dynamic range. After nine months of field experience, it can now be stated that composite 4-track magnetic sound films have repeatedly run over 500 showings and still retain their sound quality. It is well known that photographic sound tracks after a similar number of projector transits will deteriorate because of scratches, oil, and dirt in the track region.

★ ★ ★

"Unwept and Unsung"

By DR. ALFRED N. GOLDSMITH

IF the motion picture audiences were asked what the I.A.T.S.E. was, what its members did, and what would happen if there were no I.A.T.S.E., probably very few correct answers would be forthcoming. This is truly astonishing. For the I. A. is the very focus and center of motion pictures. Its members are involved in almost every step in motion pictures from production through exhibition. Their knowledge, skill, and experience are the major factors which make motion pictures possible. In a word: if there were no such organization as the I. A., there would be no such assemblages as theatre audiences!

Consider, for example, just a few of the basic tasks which the I. A. members carry out steadily and correctly, year after year, and often under unusually difficult or emergency conditions. In the studios there are endless production jobs which require I. A. technicians and craftsmen. In the theatre itself, the same requirements hold. In the laboratories and exchanges, as well, some of the tasks could not be carried out unless I. A. men were available.

These men and women are the unsung workers of the dramas and comedies which bring entertainment, happiness, and relief from the cares of everyday life to so many millions of people. In the realm of television broadcasting and theater Tv, the same condition exists, and the public again receives its airborne entertainment through the cooperation and efforts of all categories of the I. A. membership.

Always Behind, Not in, the Spotlight

All of this being the case, how does it come about that everyone knows a movie star and so few know anything about I. A. workers? One reason, of course, is that the I. A. man works largely *behind the scenes.* He is never *in* the spotlight, but rather behind it. Others may supply the glamor and excitement which makes so immediate and marked an impression on the public. But the I. A. man supplies the brain and brawn behind the show. As a genuine rather than an artificially glamorized worker, he is at a great disadvantage insofar as publicity is concerned.

Despite this lack of public knowledge and recognition, I. A. members have done a great job. Whenever a new and difficult task has been unloaded upon them, they have responded speedily and effectively. Indeed, taken by and large, rarely has any industry had such prompt, complete, and even enthusiastic support from its workers as has been enjoyed by the motion picture field.

Industry Attitude Overall Astonishing

This makes it a bit astonishing that the industry itself has not devoted more time and thought to these quiet men behind the scenes. It is easy enough to understand why the audience does not know of them. After all, the average theatergoer has little idea of what it takes to produce a motion picture and to deliver it exquisitely clear, in brilliant color and with natural sound, on the theater screen. The methods of the IA workers are fairly technical and complex.

Similarly, it is natural that the public itself knows little of the I. A. and its place in the field. And, in general, the legislators have as incomplete or even incorrect information as does the general public in these matters.

But it is much more strange that the industry itself, **including its skilled commercial** executives, seems to have only the sketchiest information concerning the great group of skilled technicians which makes the industry possible. Indeed, at times it seemed almost as if the industry were not particularly interested in the

(Continued on page 45)

Why Strong Lamps ARE USED WITH MOST CINEMASCOPE PRESENTATIONS

Greetings to Our Friends of the IATSE from the boys at Strong



Strong Lamps Are Different Because

ONLY STRONG HAS A LIGHTRONIC CRATER - POSITIONING SYSTEM

A sincere effort has been expended to the end of attaining near perfection in the presentation of this new projection technique. Best possible screen lighting has been a major objective — the most light, evenly distributed, of constant intensity and unchanging color value.

These exacting high standards have been realized with the development of Strong's exclusive Lightronic crater-positioning system which automatically maintains the position of the positive arc crater at the EXACT focal point of the reflector. Manual adjustments, which at best lead to uncertain results, have been made entirely unnecessary.

The positive and negative carbons are advanced by separate motors, the speeds of which are governed by the Bi-metal Lightronic Tube. Once the arc has been struck, the crater position and gap length are maintained automatically.

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Evolution of the Simplex Projector

By EDWARD B. GARRISON

THE BASIC requirements of machine fitting placed the thousandth of an inch as the limit of latitude, and on important parts ten-thousandths of an inch." This was the credo of Francis B. Cannock, who, together with Edwin S. Porter, laid the foundation for the design and manufacture of the precision instrument which is known throughout the world as the Simplex motion picture projector.

But preceeding the Simplex projector were a series of events which left a deep impress on motion picture technological development and contributed substantially to the present structure of International Projection Corp. These events stemmed from the brain, hand and heart of Nicholas Power. Posessed of great inventive ability and an agile and far-seeing business talent, Nicholas Power built his first projector, the Peerlescope, in 1902 in a little shop on Nassau St. in New York City.

This projector was equipped with a gaslight source and was belt-driven directly from the rim of the crank-wheel. The film, upon passing through the projector, dropped into a cloth bag which, however, was soon replaced by a sheet metal box. As much as 3000 feet of film was run into this box in a loose heap, with the ends of each reel left hanging out of the opening to be retrieved later for rewinding.

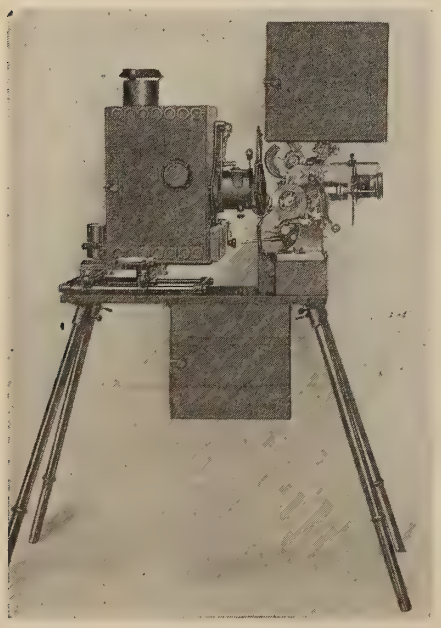
Contemporary with the Powers projector were the Edison Kinetoscope, the Lubin, the Dressler, and the Vitascope (built by Thomas Armat and reputedly the first loop-forming mechanism). There were several other "-graphs" and "-scopes" marketed during the ensuing five years, among which was the Standard projector.

All this equipment was extremely crude, by present-day standards althought it was used with fair success in the "store shows" of those days. Nicholas Power, however, with his great flair for this type of apparatus, quickly replaced model after model, each succeeding one being a great improvement over its predecessor.

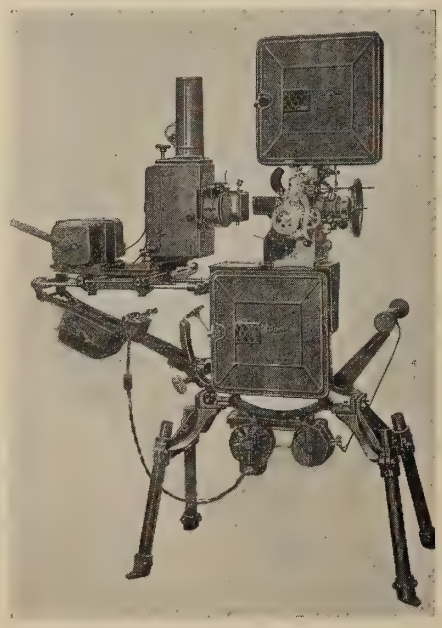
Basis for Success of the Powers

From the beginning Nicholas Power began to build up a strong patent wall around his developments, being the first to invent (1904) a satisfactory device for centering the picture in the aperture while the projector was operating, thus obviating the need for shutting down the equipment and showing a slide very common in those days: "One minute, please, to frame picture." Two years later Power obtained two other valuable patents covering the takeup device, or method of "rolling a film on a lower reel without tearing the film during the operation," and the basic patent covering upper and lower film magazines having fire-prevention film valves.

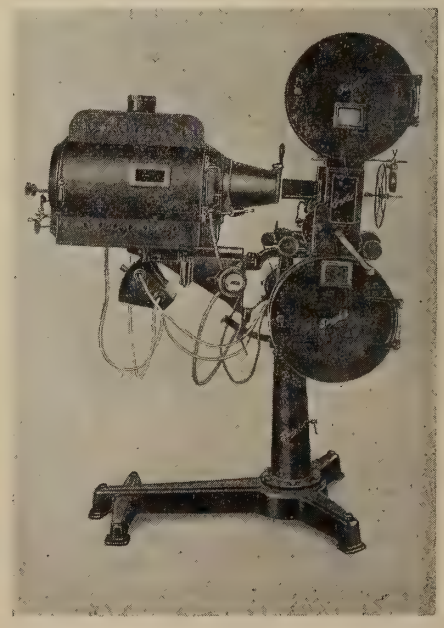
These three patents were the basis for the subsequent success of Nicholas Power and his successor, Nicholas Power Co., a corporation formed in 1907. Between 1904 and 1922 Nicholas Power obtained 57 patents covering the design and construction of important improvements in Power's projectors Nos. 4, 5, 6, 6A, and 6B, the latter being the last one manufactured. These patents covered



The famous Powers No. 6 Cameragraph (1909) having a solid-pin movement and employing the then conventional straight arc for illumination.



The 6B was the last Powers made (1920) utilizing a roller-pin cross movement. No. 7 Powers was designed but was never manufactured.



Old standby through the years — the Regular Simplex (1910). Note old framing lever. Light source shown here is the first McAuley reflector lamp.

many important devices, among which were means for:

1. Preventing the breaking of film between the intermittent movement and take-up sprocket. 2. An automatic fire shutter interposed between the film and he illuminant. 3. Further developments and improvements in film magazines and fire-prevention means therefor.

The latter three patents, along with many others, were issued prior to 1914 and apply to the Powers Nos. 4 and 5 projectors.

About 1909 a very important development took place in projector construction—the introduction of the Powers No. 6 Cameragraph which embodied a fundamentally new principle of intermittent movement whereby the film was moved down from frame to frame successively for projection, the period of movement being obscured from the screen, and one picture at a time being exposed to the illuminant; the exposure and cut-off were brought about by a revolving shutter synchronized with the intermittent and this synchonism being maintained regardless of the framing position of the intermittent assembly.

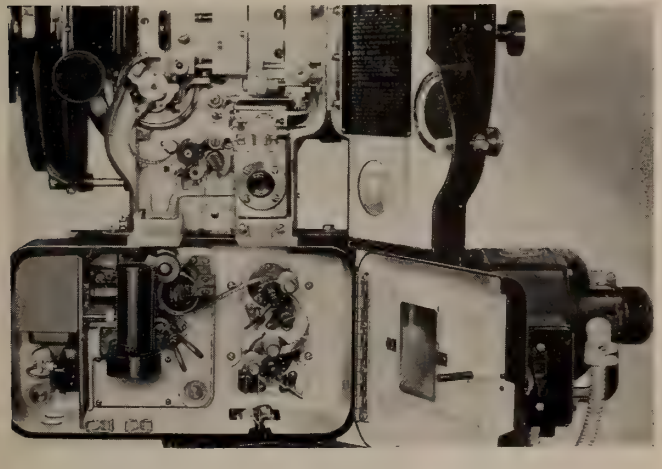
This new movement was very much faster in its pull-down period than anything previously attempted, thus allowing a longer exposure to the screen and, therefore, greater illumination. It was this improvement which forced other early competitors from the market.

While theoretically practical, the first model of this new-type movement was not altogether successful, due to mechanical difficulties; but it was quickly replaced with a device of similar construction which constituted the movement of the most recent and wholly successful Powers projector.

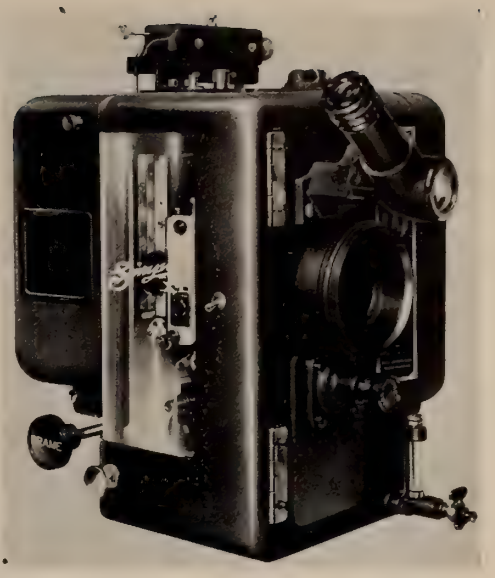
The Powers 6A Marked an Epoch

The Powers 6A projector was marketed in 1911, this being an all-metal equipment including stand, lamphouse, magazines and the No. 6 mechanism, thus eliminating the flimsy wooden tableboard. The 6A enjoyed tremendous success for many years, the period 1912 to 1916 witnessing many major projector advances of which the following are especially noteworthy:

A new stand or pedestal with a new takeup device and means for making what had by this time become necessary adjustments; a new and sturdier lamphouse to handle the increasing demands for higher currents for illuminants; motor-driving means, the fire authorities



The Simplex E-7 with soundhead attachment.



The X-L projector mechanism, latest in the Simplex-International Projector Corp. series of projectors.

having then begun to allow the use of such drives; a combination of fire-prevention devices; a mechanical variable-speed control and motor assembly; film tension shoes for projector gates whereby the film was held accurately in the focal plane for proper screen focus of the image; an improved method of framing the image; a lamphouse unit for use with the highly efficient incandescent lamps developed about that time, and a fundamentally new principle in automatic speed-controlling mechanism for use with projector drive motors.

Powers Awarded Basic Patents

Many other patents were issued to Nicholas Power Co., including a great number covering a complete motion picture projector embodying numerous basic ideas and improvements. This new projector was to be known as the Powers No. 7; but it was never put into production. The year 1911 saw only two active projector manufacturers; but beyond the horizon was brewing a storm of formidable proportions, the first faint clouds of which were barely visible. The Simplex projector was on the way.

In 1909 two new organizations had entered the field: the Precision Machine Co. which took over the inventions of Francis B. Cannock which were represented by the Edengraph, forerunner of the Simplex projector; and the American Motion Picture Machine Co., which developed the Standard projector. The latter company failed in 1913, however, leaving but three surviving projector manufacturers: Nicholas Power, Precision Machine Co., and Enterprise Optical Co.

First Simplex Scored Many Advances

The Precision group lost no time in giving strenuous and persistent battle to Nicholas Power Co., and after only three years of intensive competition the Simplex projector was firmly established on the market. Thus was established the basis for the famous Power-Simplex feud, with the proponents of each projector proving ready literally at the dropping of a word to vociferously, and often militantly, defend the projector of their choice.

The Simplex projector was of entirely different design

(Continued on page 43)

PERSPECTA—the All-Purpose Recording and Reproducing Sound System

By ROBERT FINE
Fine Sound, Incorporated

WITH the introduction of wide-screen techniques and the warm acceptance by the public of these dramatically more effective pictures, a problem was posed as to the enhancement of these presentations through the use of directional or stereophonic sound.

The first of these pioneering efforts in stereophonic sound quickly answered the question as to the distribution of stereophonic sound with a larger picture presentation. It was overwhelming; yet it proved that both direction and volume enhancement with the enlarged picture added tremendously to the dramatic effectiveness of the over-all subject material. Several systems have been used, each of which possess advantages and disadvantages. In an effort toward industry standardization, as well as minimizing costs for producers and exhibitors, Perspecta Stereophonic Sound was developed.

"Standard" Stereophonic Sound the Aim

The development was based upon observations of what constituted stereophonic sound as we heard it in the theatre and how it could be achieved through the use of standard or non-recording mediums in such a way as not to limit the use of the product only to theatres equipped with special devices for reproduction.

It was obvious that magnetic-striped film could not be played in a theatre without the proper type of reproduction heads and that it would be necessary in a general run of a double feature with associated short subjects and newsreels for the projectionist to be constantly aware of the type of product so that he could switch between magnetic reproduction and standard optical reproduction, creating somewhat of an operational problem. Also, this product could not be distributed as before because of the need of special equipment, thus a theatre equipped for magnetic reproduction was limited to fewer sources of product.

A Completely Compatible Optical Track

The development then narrowed itself down to creating an optical track that would be completely compatible encompassing some form of information so that if used with the Perspecta Stereo Integrator equipment (Fig. 1) it would reproduce with all the advantages of stereophonic sound both in quality and direction, and that if the same track were run on a *standard* projector in an *average* theatre it would reproduce as a standard single-channel normal optical track.

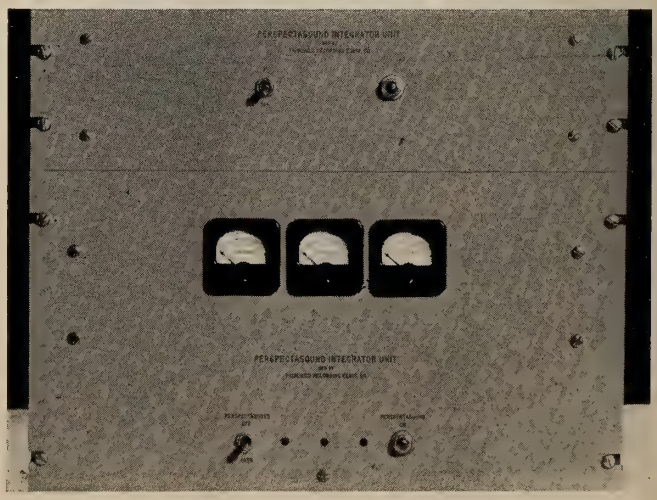
There have been many comments and discussions as to the merits of optical *vs.* magnetic track. With much misinformation circulating, there exists general confusion. There is no doubt that optical track can efficiently encompass the frequency range necessary to create life-like reproduction of sound through the Perspecta stereo system. If the optical track be properly reproduced, it is generally almost impossible on an audience level to differentiate between Prespecta stereo sound and any 3- or 4-stripe magnetic system. Here again it is necessary to keep in mind that this same track is completely compatible and can be played either as a single standard track or in conjunction with the Perspecta stereo sound Integrator as stereo reproduction.

How The System Works

The Perspecta system utilizes a single optical soundtrack. In addition to the audible sound, three subaudible low-frequency control signals are recorded. The variance in amplitude of each low-frequency control signal controls the volume of reproduction through the corresponding amplifier horn channel.

Initial tests indicated that it was possible to introduce low-frequency controlling signals recorded simultaneously, with the relative complex wave forms, and still maintain quality audio, and at the same time leave sufficient energy of the controlling signals to operate over a wide range of volume control. It was then necessary to ascertain the maximum low-frequency level that could be

FIG. 1. Front view of Integrator Unit used for the Fine Perspecta sound reproducing system.



used without sacrificing compatibility or introducing intermodulation distortion.

Standards for Low-Frequency Control Track

The first series of tests comprised low frequency-control signals in varying amplitudes. First, singular signals, and then varying combinations of the three basic control signals for observation of any in-phase additive conditions that might cause either amplitude modulation of the complex waveform or an undue amount of harmonic distortion. After a survey in a number of theatres, the standards of control signal levels were set as they now exist. The standards are that:

The maximum amplitude of any control frequency shall not exceed 16 db below a 100% constant tone level based on area film recording with a 76-mil peak-to-peak voltage. There is a test reel that incorporates a series of test signals to align the Integrator equipment, consisting of combinations of control signal and 100% tone modulation at a 16 db differential. This calibration represents the maximum reproduction volume level control that would be apparent in the theatre when the control signal reaches this 16 db point.

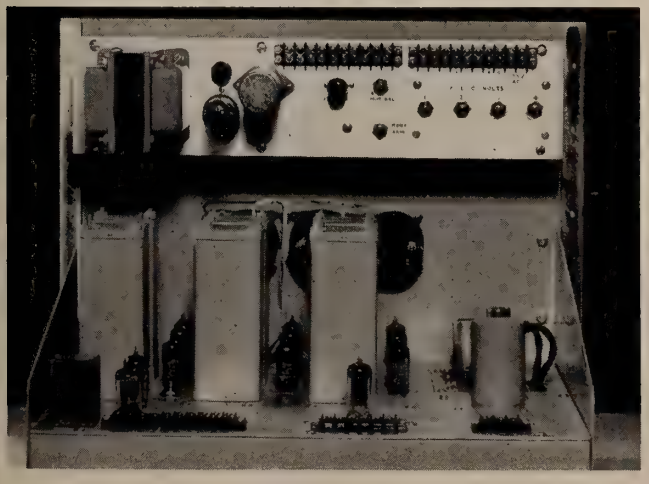
In mixing or scoring the film, to allow for the normal dynamic range of the film track, it was found desirable to set the average mixing control signal amplitude 5 db below its maximum level or at approximately minus 21 db with reference to 100% tone. This allows leeway for further dynamic enhancement beyond the limitations of the optical recording for effects and musical sequences.

"Perspecta" Not a Switching System

It should be emphasized that Perspecta stereo sound is *not* a switching system. Continuously varying amplitudes of control govern the output level of each of the three horn channels, thus giving an extremely smooth directional effect without jump between channels.

In the final release track, then, the average amplitude of any of the control signals does not exceed 21 db below 100% tone, except for effects or music sequences, thus insuring a greater compatability of the Perspecta release track. The generation for the control signal, as installed at M-G-M, Warners and Paramount, consists of three master oscillators, the frequency of which is set with the use of precise observations on an oscilliscope against the 60-cycle line frequency. One set of master oscillators can supply all the re-recording and mixing channels through the use of appropriate bridging amplifiers or pad networks.

FIG. 2. Rear exposed view of components of the Integrator Unit of the Perspecta sound system.



The Integrator, the heart of the system to which we have been referring (Fig. 2) works as follows:

It incorporates a pre-amplifier with enough gain to accommodate any type of output level from any type of projector. The output of this pre-amplifier is fed into two filters. On the audio side, a 63-cycle, high-pass filter system and booster amplifier feeds a buss connecting to the inputs of the three controlled push-pull stages, so that the same audio signal is available at the input of each of the three controlled amplifiers.

A 63-cycle, low-pass filter system with another booster amplifier feeds the inputs of the three band-pass filters. This low-pass filtering removes the largest component of complex audio program, and primarily the only intelligence at this point is a composite of the control signals. Each of the band-pass filters is unique in the following features:

Physical Size:

A great deal of engineering has been done to reduce the size of these low-frequency units.

Electrical Response:

They have a 2-cycle bandwidth, to allow for a variation up to 4% in the speed of the projector. At the same time, the filters produce a 20 db rejection at the 5-cycle point between each of the channels to give adequate separation between control channels.

Each of the low-frequency control signals after acceptance by its corresponding band-pass filter is again amplified and sent through an appropriate coupling to a diode rectifier system. The amount of rectified voltage appearing on the output of the diode rectifier sections is linearly equivalent to the amplitude of the low-frequency control signal that was introduced to the input of the band pass filter.

It is obvious, therefore, that the unit operates on a 1-to-1 ratio through its controlled range. Simply expressed, this means a 1 db change in output level of the controlled push-pull amplifier section. This insures a smooth change in volume when changing directional characteristics by variance of control signal amplitude from one band pass section to another.

Novel Automatic Switching Device

The unit also incorporates an auto-switching device, which is necessary to complete the pattern of compatability. This auto-switching circuit performs as follows:

The presence of any control signal of normal amplitude for a period in excess of 7 seconds activates a relay system which connects the output of each of the rectified components of the low-frequency controlling signals, to control the bias of its corresponding push-pull controlled amplifier stage.

Absence of all low-frequency control signal for 1½ seconds causes the auto-switching unit to deactivate the relay system. Under this condition, a bias equal to the cut-off value of the push-pull stages is applied to the two

(Continued on page 41)

From Magic Lantern to Giant Screen, Stereo Sound

By H. T. MATTHEWS
Motiograph, Incorporated

AS MOTIOGRAPH nears its 60th anniversary, this pioneer motion picture equipment manufacturer can proudly share that occasion with the entire industry, having made its start in the mid-'90s, shortly before the first commercial film showing in America. It was in that period, too, that the Optigraph, the first of a long series of projectors, was introduced by this company.

In the years since, Motiograph has developed a complete line of sight-and-sound projection equipment. Each new model produced down through the years was evolved through efficient engineering, experienced workmanship and well-made parts.

"Entertainment Packet" Including "Magic Lantern"

It was in 1896—58 years ago—that motion pictures were first shown in a regular theatre. The curtain rose on the famed nickelodeon. Nearly a hundred years of diligent endeavor had made this nickelodeon possible. In this setting Motiograph made its bow by introducing the Optigraph, first of a long series of projectors.

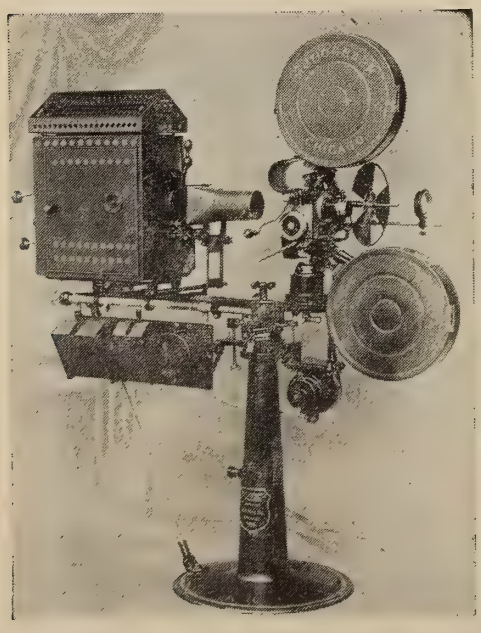
Alvah C. Roebuck, native of Lafayette, Ind., and the Roebuck of the famed mail order house, conceived the idea of offering an "entertainment outfit" by which the purchaser might liven up church social activities and at the same time earn some extra money for himself and the church.

In 1896 this offer included a "magic lantern," several sets of slides, a supply of advertising posters, admission tickets: and a book of instructions. The idea was a great success, orders poured in from all parts of the country to Enterprise Optical Mfg. Co., predecessor of Motiograph, Inc. Also, plans were being made to "shoot" the Corbett-Fitzsimmons championship fight at Carson City, Nev., and also a reenactment of the Oberammergau Passion Play, done in New York.

Viewing all this activity, Roebuck envisaged a tremendous future for this new entertainment medium. Consequently in 1898 he set upon the production of what has since come to be recognized as the first practical motion picture projector—the Optigraph.

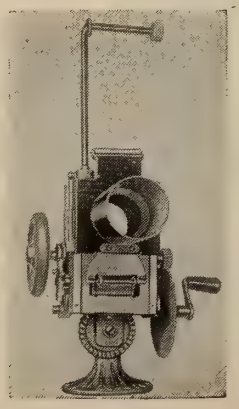
But the Optigraph was not to remain long in the state of its first model. Improvements were many and rapid, including a redesigned mechanism, and efficient

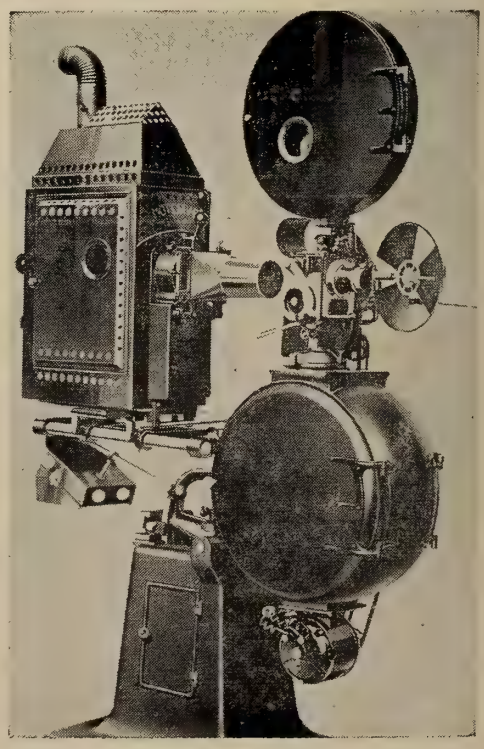
The First 20-Year Span in the Development of Motiograph



Model 1A Motiograph (1908) had a strong cast iron base, instead of small tubular legs, and an improved shutter. The first truly commercial Motiograph unit.

Below (center cut): the Optigraph, one of the first practical motion picture projectors and forerunner of the Motiograph series of projectors.





Model E Motiograph (1916) with motor beneath the lower magazine operating the mechanism by belts. Positive speed control, and new condenser mount.

framing device and a takeup reel which provided more safety and greater film protection.

Roebuck's vision was taking shape. National news events were now being filmed, among them the funeral procession for the victims of the U. S. S. Maine, and the embarkation of Teddy Roosevelt's famous Rough Riders for Cuba.

IA Mechanism Motio's Real Bid for Prominence

Motiograph's real bid for a prominent position in the theatre equipment field was made in 1908, when Roebuck produced his Motiograph Model 1A, well-engineered and even today considered a high-grade projector. The 1A boasted an improved shutter, a very accurate Geneva movement, and a strong cast-iron, circular-base pedestal, instead of small, tubular legs. The crank and stereoptican arrangement of the earlier models was retained.

Roebuck's constant desire to maintain a margin of superiority by means of improvements and new inventions resulted in a new projector, the Model D Motiograph. In a short space of time, he received nearly 100 successful patents. One of the many changes incorporated in the new models included the first double shutter of the Model D.

The next epoch in Motiograph history was the Model E, produced in 1916. Among the principal new developments of this projector were the positioning of the motor beneath the lower magazine. This operated the mechanism by belts and was provided with a speed control that made speed variation absolutely mechanical and positive. A newly-designed condenser mount enabled removal of the lenses without touching them. Both the stand and the magazines embodied revolutionary improvements in design.

The Model E appeared at a time when theatremen were becoming more projection-conscious. They were paying better prices for better pictures like Griffith's "Intolerance" and Charles Chaplin's "The Floor Walker." By 1917 there were 17,000 theatres in America devoted to the presentation of motion pictures, and the end of World War I further accelerated the building of larger and better theatres.

Model F Projector Still Serving Many Theatres

The year 1921 marked two great achievements: Rudolph Valentino's "The Four Horsemen of the Apocalypse," which did a steady and phenomenal business for years, and the introduction of Motiograph's Model F, which set new standards for steady projection. This projector still is giving service in a number of theatres today.

For the first time, the mechanism was enclosed, giving the projector a decidedly improved appearance. There was a better lens arrangement, removable bearings, and a variable-speed gripping disk. While it was still the front type, the shutter now had two blades, as well as a timing device adjustable while the machine was in operation. The base had been improved for tilting, the magazines provided with peepholes.

When sound came in, Motiograph was ready with its new Model H. This projector introduced the first rear-shutter and the first double-shutter, providing a far more brilliant picture and resulting in less heat at the aperture. It also introduced Motiograph's Mirrophonic sound system, which reproduced sound on film and Vitaphone records. The projector included a pinion framer, operated by means of a wheel located behind the lower magazine, and a base which had been redesigned to meet the requirements of sound equipment.

New reflector arc lamps which, burning 15 amperes and projecting more light than had heretofore been possible with vertical condenser-type arcs burning 50 amperes, were introduced by a number of projection arclamp manufacturers. This better light source, together with Motiograph's improved projectors, vastly improved the screen image.

Present Management Took Over in 1935

In 1935, Fred, Thor and Doug Matthews took over the interests and active management of Motiograph, and one of their first accomplishments was the development of the Model HU projector.

In 1936, numbering such productions as "San Fran-

(Continued on page 50)

TESMA and the Projectionist: a Common Interest

By FRED C. MATTHEWS
President, TESMA

TESMA—Theatre Equipment and Supply Manufacturers' Association—is not as old an organization as the IATSE, although many TESMA members have served the motion picture industry quite as long as the charter members of the IA. The TESMA membership now includes virtually every manufacturer of theatre equipment.

Those TESMA members who manufacture screens, lenses, projectors, sound systems, arc lamps, generators, rectifiers and projection room accessories are particularly conscious of the contributions of IA members to the motion picture industry. The latter have contributed in many ways to industry welfare by making suggestions and recommendations to manufacturers for improvements in their products and by properly operating and maintaining projection and sound equipment in tip-top order.

New Picture Processes Pose Challenge

At the same time, and particularly in the last year, TESMA members have also contributed to the forward-looking aspect of the entire motion picture industry by making available equipment to present the new picture processes to the movie-going public. But no matter how well equipment is designed and manufactured, it takes long experience to operate that equipment properly. Manufacturers and theatre owners alike should be, and I think they are, grateful to the thousands of experienced projectionists in the ranks of the IA.

This year TESMA will conduct a gigantic Trade Show of motion picture equipment at the Conrad Hilton Hotel in Chicago from October 31st through November 4th. We hope that the many IA members will visit our show and see and compare the equipment to be shown.

★ ★ ★

3-D Movies . . . Epitaph or Prologue?

By JOHN NORLING
Loucks & Norling, Inc., New York

THREE-D film appeared at a time when the motion picture industry needed a stimulus of some sort. That 3-D was a stimulus that brought increased business is a well-established fact. Because it was such a success at the outset should have been no assurance that it would continue that way. Certainly, the industry seemed to have done almost everything possible to make its success short-lived.

Producers madly went ahead with inadequate equipment operated by persons to whom the fundamental principles involved were as unfamiliar as Sanskrit is to the average person. Exhibition could not have been more badly handled than it was. It was a long time before projectionists, incredulous that a major industry in dire straits could indulge itself in further economic strangulation, became aware of what their pay-giving bosses *thought* they were doing.

The 3-D Projection Shambles

Even after the projectionists had learned the *how* they were not provided with the proper *means*. Interlock mechanisms were often of the shoddiest design and assembly; port-hole filters were often of the wrong type or of inferior polarizing materials. And they were almost impossible to keep clean.

The exhibitor was provided, in many cases, with polarizing viewers that were nothing but junk. Unsatisfactory screens were more common than good ones; in many cases the theatre owner was told that all he needed to do was to have his old screen sprayed with aluminum paint.

No other American industry has ever done the deplorably stupid things that the great (?) motion picture industry was guilty of when it latched onto (literally) 3-D. No wonder 3-D films came upon evil days.

A Long-Look into 3-D's Future

What does the future hold for 3-D? Nothing but interment unless the industry realizes its great potential and supports the research and development that will assure the perfection and convenience required. Certainly the attempt to apply 3-D to the various wide-screen processes will be a complete failure unless a lot of new development work is undertaken in advance.

Dual projection must go! It was an expedient—and that's all! Its inconvenience and unreliability were recognized by projectionists from the very outset. If 3-D has any chance for revival, acceptance and growth, some single-film system must be used. At present, the Vectograph process invented by Dr. E. H. Land of Polaroid Corp., and Joseph Mahler, and being developed by Polaroid and Technicolor, offers the best solution. For one thing, it affords a better utilization of light than is possible with any other single-film method.

The full possibilities of 3-D have not been explored. Among all the developments of the 3-D art, there is one which has some of the greatest potentials, and that is binaural sound. Binaural sound will give each ear its own sound signals just as stereoscopic photography gives each eye its own picture signals.

Binaural sound is quite different from stereophonic sound. It provides, the writer thinks, the ultimate in sound reproduction, as far as giving a sense of location of the sound source is concerned.

It doesn't merely "tell" whether the sound source is at the left or right or in any other direction: it pinpoints the sound in space, and in its exact direction, tells not broadly that it's from left or right, but tells exactly where it is to the left or right and how far away it is.

Binaural sound is *true 3-D sound*. It doesn't seem to emanate directly from the lips of an actor, from the oboe playing the obligato, from the place where water drips from an overflowing gutter, from a mischievous boy barely seen behind the shrubbery. It is as different from stereophonic sound as a big picture is different from a small picture.

Binaural Sound, Plus 3-D

Stereophonic sound is exciting, is effective, particularly for wide-screen presentations of conventional films. It is doubtful whether binaural sound would contribute much to a 2-D wide-screen movie, but it certainly would add the *ne plus ultra* to the 3-D wide-screen presentation. And 3-D wide screen movies can be produced and presented. There are no technical problems unique to 3-D that do not exist for 2-D wide-screen.

We may look forward to wide-screen 3-D as an early embellishment of the art, and to the eventual wedding of binaural sound with wide 3-D—a wedding the consummation of which would undoubtedly result in a robust box-office.

The "stereoscopic window" is often touted as a prime necessity for standard 3-D presentations. The stereoscopic window is something that has been contrived to achieve coincidental image reconstitution and to avoid marginal disturbances. We don't have to have this window if certain 3-D photographic and projection procedures are employed.

It is perfectly possible to have 3-D pictures existing in space the margins of which are vignetted, gradually shaded off from outer darkness to the full illumination of the picture itself. Some optical problems exist in the methods of doing this, but they are not very difficult to solve.

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Philosophic Background of Labor Unions

By SUMNER H. SCHLICHTER, Ph.D.

TO THE man in the street, the principal function of unions is to raise wages and reduce the working day. But this conception misses the main significance of labor organizations. Primarily they are significant because of their relationship to the government of industry. In the early Middle Ages, sovereignty and property were

separated — the ownership of land carried with it many powers that have since become functions of the state. The gigantic units of modern industry appear to be bringing about a revision to the days when the sovereignty was an attribute of property.

Pre-Operating Procedure

With the ownership of property went the power to prescribe rules which affected employees as intimately as did the ordinances of the city in which they lived, rules which prescribed when work should begin, how long the men should have for lunch, when work should cease, for what reasons and how long employees might absent themselves without losing their jobs, whether payment should be by the day or by the piece, by whom and for what reason a man might be discharged, how promotions and lay-offs should be made.

Modern business enterprises, unlike feudal lords, do not have their own courts, but the control over discharge gave them a rough equivalent.

Decisions Based Upon Rules

Wage-earners have sought, through the organization of trade unions, to resist the tendency of property to acquire sovereign or quasi-sovereign powers. Wherever trade unions have sprung up, they have sought to make shop rules a matter of joint determination and their administration a matter of joint control. In other words, in the place of despotism under which the word of the manager is final, unionism seeks to introduce the principle that decisions should be based upon rules and that rules should be based upon the consent of the governed.

Management-Employee Cooperation Fruitful

Quite a large number of labor unions — notably the machinists, the electricians, the sheet metal workers, the boilermakers, the blacksmiths, the carmen, the printing pressmen, the photo-engravers, and the clothing workers — have demonstrated not only their willingness to cooperate with managements in solving proplems of operation but their ability to make an important contribution.

Needless to say, these organizations are not willing to cooperate on *any* terms or conditions. Naturally and properly, they put the interests of their members ahead of the interests of the stockholders for whom they work. The fact remains, however, that ingenious and far-sighted leaders on both sides who possess the will to cooperate have succeeded in discovering a basis on which management and labor can join to promote the interests which they have in common.

Union-Management Cooperation?

Whether or not the dominant role in American industrial relations during the next generation will be union-management cooperation or bitter class-struggle depends upon the leaders on both sides. My prediction is that the policy of union-management cooperation will prevail, because I am confident that there is enough industrial statesmanship among American business men for them to realize that the policy of suppressing organization is the policy of sitting upon a safety valve.

★ ★ ★

EASTMAN

Synonym for Photography



George Eastman

OF all the fields open to young men in the 1870's, photography was one of the most challenging. George Eastman, founder of Eastman Kodak Co., discovered this when he purchased a photographic outfit in 1877 and set about penetrating the mysteries of picture-making. If they were not actually held in disrepute, practitioners of the art were viewed with humorous indulgence, and the back-breaking paraphernalia which they were obliged to carry about with them did nothing to relieve their plight.

The 23-year-old George Eastman shouldered his darkroom tent and cumbersome wet-plate apparatus with the rest—but unlike them he was not content to carry the burden for life. His inquiring mind explored the possibilities for improvement, and he found the challenge a heady one. He proceeded to devour all the photographic literature of the day and applied himself in his spare time to experimentation and study.

Eastman's Historic Dry Plate

The result of his painstaking—and sometimes heartbreaking—work was the perfection of the photographic dry plate in 1880 which, in contrast to the wet plates used prior to that time in conjunction with bulky and complicated equipment, made photography a relatively simple process.

Eastman once said: "A lot of failures often lead up to success." He spoke out of his own experience: ruin threatened him more than once. His energy, application and purpose turned those failures into success—but it was his vision that built an industry and brought photography within the reach of almost everyone.

Very early in his career that vision led him to devise a plan of action for the conduct of his business from which he never deviated. The wisdom of his program became more and more apparent in the ensuing years: Kodak's part in the advancement of science and the betterment of humanity through photography may be directly traced to the principles he laid down. They were followed during his life and continued after his death up to the present day:

Eastman Kodak Co. Basic Principles

1. Mass production at low cost
2. Intensive photographic research
3. Development of new products
4. World distribution
5. Growth of company facilities and services
6. Extensive advertising
7. Employee benefits

The history of Eastman Kodak Co. is the iteration

and reiteration of these fundamental founder principles.

"Milestones in photography," whether in still-picture or motion-picture form, would be a wholly ineffectual title for the listing chronologically of the contributions made to the art by Eastman Kodak Co. for the simple reason that the name "Eastman" is automatically translated in the minds of millions of people the world over as a synonym for photography.

Some Noteworthy Recent Developments

Of particular interest herein, however, is the appended list of a few achievements of the Eastman group in the 35-mm professional film during the past 15 years:

Fine Grain Sound Recording Films Type 1372 (variable area) and 5373 (variable density) which improved motion picture sound quality. These films are now Types 5372 and 5373, the first digit 5 indicating safety base.

Color Negative Film Type 5247 (daylight balance) and Color Print Film Type 5381. These two films were supplanted by Color Negative Film Type 5248 (tungsten balance) and Color Print Type 5382. Companion products are Panchromatic Separation Film Type 5216 for the production of separation positives, and Color Internegative Film Type 5245 for the making of duplicate color negatives.

These films have found wide acceptance in the entertainment motion picture industry for the production of high quality 35-mm color release prints for theater use.

Tri X Panchromatic Negative Type 5233. This product has just recently been introduced and is destined to find wide usage wherever a very high-speed negative with relatively fine grain is required. It is especially adaptable to various types of news work where pictures must be taken under conditions of low illumination.

Introduction of Acetate Safety Base

Perhaps the most important development of all was the complete discontinuance of nitrate base film and supplanting it with triacetate safety base film. This base is now superior to the former nitrate base in all characteristics and has the obvious added advantage that it eliminates for all intents and purposes the fire hazards that existed before with nitrate base film.

A great amount of experimental work has been done by Eastman Kodak toward improving the projection life of film and the problems brought about by the need for putting more light on theater screens.

Eastman Kodak Co. developed a drying method for motion picture film for use in laboratories which enables film to be dried in only a fraction of the time required heretofore. This system utilizes high-temperature air which impinges directly on the film.

★ ★ ★

New Techniques, Equipment Dominate Movie World

By WALTER GREEN
President, National Theatre Supply Co.

VIEWING the technological changes which have taken place in the motion picture field during the past two years, one just must respect the resiliency and recuperative power of the exhibition end of the industry. "Bounce" might be a more apt descriptive term for this go-and-get-it-done spirit which is the mark of the many thousands of showmen—seen and unseen by the paying patron—throughout the world, but it would be "bounce" compounded of many diverse qualities.

Witness, for example, the developments in the industry during the past two years. Decisions as to the nature, the content and, above all, the format of the motion picture were made practically overnight in the production centers. Assuredly, consideration of the manner of exhibiting these new, and sometimes radically different, techniques was extended; but the *practical application* of these techniques, the translation from a thought process to an economic reality *via* the box-office is the concern of the equipment manufacturer, the supply and service organizations, and last but by no means least the *effective delivery* of the finished product by the theatre's technical personnel—in most cases, the projectionists.

Panoramic View of Industry Needed

The supply dealer (and particularly the supplier who operates on a national scale and still has to consider the purely local character of any given operation) is unique. He it is who has to be hydra-headed with a vision broad enough to encompass the current trends in production, the availability of suitable equipment in sufficient quantity to satisfy the demand, the means for the quick transit and efficient installation of that equipment, and the final and vital requisite that, once installed, the equipment measure up to its pre-performance rating. Nowhere along this tenuous line is all-out cooperation more vital than at the link between the supplier and the user.

Strenuous as have been the past two years for all branches of the motion picture industry—and particularly for those of us who are directly involved in the delivery to the public of the finished product—it is obvious that the changes wrought in both production and exhibition have infused new and richer economic blood into the industry.

Opposing Views Stimulate Thinking

Honest differences of opinion as to the various new processes of production and exhibition there certainly have been, but these divergent views have in themselves been a blessing because they stimulated serious thought as to the *means* employed to best exhibit the industry's wares. Producers, distributors, suppliers, exhibitors and projectionists were somehow channeled into a single stream of thought by reason of the intense common concern about techniques and equipment.

The industry generally, and particularly the exhibition branch, has been intensely concerned with, and sometimes apprehensive of, "new" processes. Yet the "new" approach in itself is a mark of industry vitality which will serve all of us well in the struggle out of the swamp of stagnation.

It is evident that the new processes employed by the

motion picture industry have at least held in check the pressures exerted by other forms of entertainment, including television. In terms of form, content, color and sweep of action provided, the motion picture theatre today need not give ground to any other entertainment medium. Of course, it would be a boon to our industry if the thousands of free and therefore untaxed Tv broadcast tickets were eliminated.

Over-All Cooperative Effort Will Prevail

Daring and imaginative in providing the new and novel our industry has been during the past two years. Given the proper application on both the production and exhibition fronts of those new techniques which sprung from our own resourcefullness and ingenuity, our sector of the entertainment world should and can continue to flourish.

★ ★ ★

The SMPTE Salutes *the IATSE*



By HERBERT BARNETT
President, SMPTE

THE past two years mark perhaps the second greatest evolution the motion picture art has known. Feverish development and exploitation activities have brought unusual problems to every segment of the industry. Engineers have been required to compress into weeks and months programs which would normally require years.

Creative people have faced the necessity of adapting new techniques and expressing these in a manner to take full advantage of the available potentials. Equipment manufacturers, theatre owners and managements everywhere have been called upon for decisions of gravity seldom encountered in this industry.

In these matters, it is recognized by all that a great portion of the burden of successful exploitation depended heavily upon the various segments of the I.A.T.S.E. Its membership was required to adapt promptly to new techniques, equipments and conditions. The degree to which they succeeded in this obligation meant the difference in success or failure of any new process.

Sixty Years of Craft Advancement

This, of course, is no new role for the I.A.T.S.E., as its membership has quietly accepted various evolutions in the art for more than 60 years. Their part in making and exhibiting motion pictures is so consistently well performed that it is too often viewed as routine. This only emphasizes the degree to which they have mastered the techniques involved and the constant determination to keep abreast of change and progress.

We of the SMPTE feel especially close to the I.A.T.S.E., for we as a team are the technicians upon whom good product depends and we in turn are quite dependent upon each other. The Society numbers among its membership many I.A.T.S.E. members, and we consider these to be a vital part of the organization.

The SMPTE salutes each of you as valued assets in the motion picture art and for your continued devotion to the unheralded job of producing and selling high-quality entertainment to American audiences.

★ ★ ★

Seamless Screen Specialists

THE ACQUISITION by the Bodde Screen Co. of additional matrixes now enables it to supply custom-made seamless projection screens on a quantity production basis without sacrificing quality or longevity of the finished product. Heretofore it has been impossible to fill other than special orders, mostly from the major studios, preview theatres, experimental installations and the like.

The Bodde seamless screen is cast in one piece—not a seam in any size ranging up to 35 x 90 feet. These screens are free from streaks, "clouds" and perforation blemishes. The basic material for these screens is now double-weight in thickness for greater strength, and it has been approved by the U. S. Army Air Force for fungus resistancy. Importantly, these screens are washable with any soluble soap solution, or they may be cleaned by simply flushing them with clear water.

High Sound-Transmission Quality

Anent the sound-transmission quality of the Bodde seamless screen, the Motion Picture Research Council reports only a one-half db loss overall. This low figure is due mainly to the fact that this screen is manufactured from ethyl cellulose instead of the usual spongy vinyl-type material. The screen is certified as flame-resistant (self-extinguishing) by the State of California.

The only cloth in the Bodde screen is the molded binding on the edges. The highly reflective aluminum surface retains its stability because the aluminum is incorporated in the basic sheet itself.

Reflecting Factor Data Essential

Bodde screens are obtainable in three reflecting factors: Type A (for a narrow theatre) has a 4:1 gain factor; Type B (for a medium width theatre) has a 3:1 gain factor; Type C (for a wide theatre and/or a steep balcony) the gain factor is 2½:1. The screens are shipped in kiln-dried wooden boxes on 3-inch seamless alumnium poles, with cotton-soft liners between screen surfaces for protection in shipping and storage.

"Gain factor" is a mighty important factor in the selection of a projection screen surface, thus it is imperative that such data be given the supplier. Complete data on a screen surface for any and all uses will be forthcoming promptly upon request to Bodde Screen Co., 8829 Venice Blvd., Los Angeles 34, Calif.

No matter what the screen problem, Bodde will service without charge and inquiry thereon.

★ ★ ★



VIEW OF PARIS by Friedrich von Martens in 1846 shot with a panoramic daguerreotype camera of his own invention. Wide angle? Yes, indeed.

The Lure of Wide Pictures

The "enveloping" of the spectator is an obsessice cliche employed by those who advocate wide-wide visual images. For panoramic viewing, whether direct by the viewer or on film—maybe; but for *dramatic content* requiring viewing concenration by the viewer—it would seem to be *no!* esthetically and physiologically.

THE WIDER THE PICTURE and the wider the screen, the more the spectator feels enveloped. He cannot see all the picture at a glance, and the scanning which he is forced to do heightens the illusion of reality. This type of picture found expression early in photography. Friedrich von Martens, a German engraver in Paris, designed a special camera for daguerreotype plates in 1844 that would make pictures about 5 inches high and 17½ inches long. He made the view of Paris reproduced here in 1846 with this strange camera that held the long plate in a curved position while the lens swung during exposure.

Rotation of the Entire Camera

This principle of using a curved sensitive surface with a swinging lens was followed by other camera makers, notably Moessard in his Cylindrographe camera in 1854, and Eastman Kodak Co. in its Panoram Kodak camera of 1899.

The daguerreotype plate, made of silver-plated copper, could readily be bent; but when rigid glass plates superseded it after 1851, some other means had to be found. M. M. Johnson & Harrison, of London, solved the problem by using a long glass plate, a stationary lens, and a mechanism to rotate the *entire* camera: the same clockwork that turned the camera also moved the plate past a slit at a rate of speed which would allow the image to be registered continuously without a blur.

Spool-to-Spool Wind

This was an awkward camera, and as soon as film became available a more compact one was devised which wound the film from spool to spool in time with the movement of the camera. This type of camera, typified by the Folmer and Schwing Cirkut camera of 1908, became extremely popular. Thousands of companies of soldiers, high-school classes, and mountain ranges have stood in front of this ingenious device.

It is a little confusing that most writers lump these two very distinct kinds of cameras under the term "panoramic", without qualification. In the past century various advertisements have frequently praised the greater sense of "reality" that the wide pictures offer. The feeling probably comes from the reconstruction of the spectator's normal relation to the visual world.

Wide-Angle Vision—in ONE Plane

Man has a wide-angle vision, and as he turns his head it becomes wider; if he spins on his heel, his angle of effective vision increases to 360 degrees. Consequently, to get the maximum sense of envelopment the spectator should stand in the center of a circular room with a picture stretching from *floor to ceiling* surrounding him. Thousands were entertained with such a device at the Paris Exposition of 1900.

Photographic and Projection "Bend"

A number of distortions arise in wide-field photography, some of wnich can easily be demonstrated and remedied. In the view of Paris, for instance, the river seems to bend towards the spectator when it is viewed as a flat picture. But if the picture be curved into the same position the original daguerreotype had as it rested in the camera, the river is returned to its bed.

Try it!

[NOTE: *But*—it's still distortion —ED.]

★ ★ ★

Perspecta Sound System

(Continued from page 33)

outside channels, thus desensitizing them by approximately 25 db.

Simultaneously a fixed bias can be adjusted at the unit to insure a correct level balance between Perspecta stereo sound operation and monaural or normal film track operation. The value of bias will be applied to the center controlled amplifier section. This insures the compatability of the Perspecta stereo sound Integrator Unit, so it automatically, presents either standard optical track or Perspecta stereo sound scored optical track, correctly in each case, and the projectionist need not be concerned as to the type of optical track running through the soundhead.

If, in a rare instance, a track is played for non-Perspecta stereo sound reproduction that contains an abnormal amount of low-frequency energy for extended periods of time that may cause the auto-switching circuit to operate, there is provided, on the front panel of the unit, a switch which will manually *deactivate* the auto-switching system so as to insure no interruption of normal performance during this abnormal situation.

There is an indicator light on the front panel of the Integrator unit that indicates when the auto-switching circuit has changed to Perspecta stereo sound operation.

The installation of the Integrator in the theatre is a relatively simple procedure. The output of the changeover switch is connected to the input of the Integrator, which is equipped to provide adjustment to accommodate the variances in level at this point in different types of systems, *i.e.*, the RCA low-level system or the Westrex high-level, pre-amplifier system.

The output of the Integrator is connected through a ganged fader system to the input of the three amplifier channels. After installation, the projectors are adjusted so that they have an equal output and equal frequency response. After this adjustment, the Perspecta stereo sound calibration reel is run through each of the projectors and the Integrator unit is calibrated.

No 'Deviling' the Projectionist

From here on, with the switch set for automatic operation, the projectionist need not be concerned as to whether he is playing a picture scored with Perspecta stereo sound or a regular soundtrack. As noted previously, if there is Perspecta stereo sound scoring on the soundtrack for 7 seconds, the unit will automatically switch into Perspecta stereo sound 3-channel operation and remain in this position for the duration of that sound track. When there is no low-frequency control present, the unit will not be activated and the sound will be channeled through the center horn system.

The 30-cycle filter controls the volume level of the left horn system as seen facing the stage. The 35-cycle filter is for the center horn system. The 40-cycle filter is the control for the right-hand horn system.

In scoring a picture for Perspecta stereo sound, a composite soundtrack is most generally used for making the final recording. The track is run synchronously with the picture and monitored through an Integrator Unit so

A TIP OF THE HAT

TO EVERY PROJECTIONIST

FROM . . . NATIONAL THEATRE SUPPLY

Division of National • Simplex • Bludworth, Inc

that all changes in carrier amplitude, with their resultant directional changes, can be observed by the mixer simultaneously with the combination of the control signal and audio tracks for the final release track. After the optical track is made, incorporating the control signal information, it is interlocked with the picture again to check mix and direction. When approved, a final release composite print is made.

This technique follows lines well established within the industry. The Integrator unit with its corresponding power amplifier and horn channels, is the only addition necessary in the theatre.

A general plan for installation has been hit upon that fulfills completely the requirements of the average theatre based upon experience with the Loew's theatre installations. These houses were equipped with penthouse reproducers and stereophonic channels with magnetic reproduction; also, they were equipped for standard optical reproduction through a separate set of amplifiers with the addition of an Integrator unit which would reproduce through their stereophonic power amplifier system from the standard optical head system.

Altec Service Corp. devised a very novel switching arrangement that minimizes confusion for the projectionist. This switching system is mounted in the close proximity of the Integrator unit and has three positions:

THE FIRST POSITION is labelled "Standard Optical": when in this position the output of the soundhead is fed through the normal optical channel that has always been in the theatre to the center horn and is used more or less as an emergency system.

THE SECOND POSITION is labelled "Magnetic": this connects the output of the penthouse reproducers to the equivalent stereophonic power amplifier channels through the ganged fader.

Switching to Perspecta Sound

THE THIRD POSITION is labelled "Perspecta Sound": this position connects the output of the optical soundhead to the input of the Integrator and the output of the Integrator through the ganged fader system to the stereophonic power amplifier system.

With the switch set on "Perspecta Sound," the projectionist need not be concerned as to his newsreel and short-subject program reproduction because, as outlined previously, the Integrator will switch from stereophonic reproduction to center horn reproduction *automatically* based on whether the program is scored for Perspecta stereo sound or standard film.

In the field tests that now have been running for 5½ months *throughout the world*, there has been very little or no difficulty encountered in most installations and runnings. In theatres having no regular service organization, the projectionist need only run the Calibration Reel once a week or so just to check the over-all operation of his soundheads from a sensitivity standpoint, and to get indication as to exciter lamp brightness and balance between projectors. Under general operation there is no need for any particular service to the Integrator unit itself. It is a stable, well-engineered device, and should prove trouble-free for extended periods of time.

★ ★ ★

Greetings and Best Wishes

to all the delegates

IATSE and MPMOU Convention

CLAYTON PRODUCTS CO.

JOE CLAYTON

Member, Local 306, New York City

Compliments to . . .

I. A. T. S. E.

BODDE SCREEN COMPANY

8829 VENICE BLVD., LOS ANGELES 34, CALIFORNIA

Manufacturers of Cast "Truly Seamless"

Quality Theatre Screens

Evolution of Simplex Projector

(Continued from page 31)

from the Powers in that it was a considerably more compact mechanism completely enclosed, being on a pedestal of entirely new design and having a great many features which appealed tremendously to the projectionist. Precision also built up an excellent patent structure covering, among many others, the following salient features:

1. The basic patent covering the entire equipment and including the new framing device by means of which this operation was accomplished by rotating the intermittent casing about the intermittent sprocket axis.
2. A new method of focusing lenses on projectors.
3. An entirely new gate and film-holding structure to maintain the film in the correct optical plane above the intermittent sprocket.
4. Complete enclosures for the mechanism, all prior mechanisms being of the open type with gears exposed.
5. The method of framing the picture in the Simplex mechanism.
6. An improved film-gate door lock, enabling the projectionist to easily close and latch the film-enclosing gate.
7. An entirely new design of fire valve for film magazines.
8. An entirely new type of mechanically-controlled variable-speed device for use with constant-speed motors on projectors.

The corporate existence of International Projector Corp. dates from 1925 as a result of the merging of Precision Machine Co., Nicholas Power Co., and the Acme Motion Picture Projector Co., with all manufacturing facilities and personnel being concentrated at 90 Gold Street, New York City.

This consolidation ushered in a new era of development in projector manufacture, one of the early fruits of which was the Super Simplex mechanism. This projector, while resembling to some extent the older regular Simplex mechanish, embodied many improvements making for better visual projection, greater ease of operation, and considerably more efficient handling of the lens system. A great improvement was made in the intermittent movement by the development at the plant of machinery for manufacuring the operating parts of the movement, that is, the star wheel and cam, and for obtaining far greater accuracies than were obtainable previously.

Another major Super Simplex development was the removal of the revolving cut-off shutter to the rear of the projector so that it interposed between the illuminant and the aperture plate. Other Super Simplex improve-

INTERNATIONAL PROJECTIONIST

A Technical and Craft Journal



WALKING THE PATH
OF PROGRESS TOGETHER!

In company with his skilled fellow craftsmen of IATSE, the ALTEC SERVICE engineer travels the path of progress toward the common goal of technical perfection in the field of entertainment.

ALTEC
SERVICE CORPORATION

161 Sixth Avenue, New York 13, N. Y.

SPECIALISTS IN MOTION PICTURE SOUND

ments involved a new type pad roller arm for accurately maintaining the film on the sprockets, a threading lamp for quick and accurate framing before projection, and an assembly of enclosures for the entire mechanism.

Sound Eliminated Powers Projector

Now occurred one of those entirely unforseen and wholly unpredictable situations which resulted in the virtual elimination of the Powers projector from the theatre field. Sound reproducing equipments made by W. E., and later by RCA, were in the beginning made for adaptation to the Simplex projector only, this being because several of the large-circuit early buyers of sound equipment were largely equipped with Simplex mechanisms. So heavy was the first wave of sound equipment orders that neither W. E. nor RCA paid any attention to the development of a unit for the Powers projector.

This circumstance, although a mortal blow to the Powers mechanism, was in some ways a blessing to the industry because it resulted in the replacement of a tremendous number of Powers units by new Simplex equipment which was destined to render yeoman service to a harassed industry in the dark depression days that were to follow.

This story would be meaningless indeed if it failed to include other outstanding developments by International Projector Corp.: the Simplex Sound System, the Simplex E-7 projector, and the current X-L mechanism.

It may be said in passing, however, that the Simplex Sound System was particularly a child of fortune in that it was designed and manufactured at a time when the sound reproduction art had long since emerged from its cocoon and was already the beneficiary of many notable advances which made for superior performance by vastly improved circuits, better tubes and speakers, greatly enhanced recording, and other factors which enabled a compact reproducing system that shamed the early models of sound equipment.

Advances Scored by International Projector Corp.

A detailed description of the many technological advances scored by International Projector Corp. since its inception would require many times over the space available herein. Milestones in its forward progress, however, are easily recognizable to those veteran practitioners of the projection process, such as:

The Regular Simplex mechanism which first appeared as a single-bearing unit and then gave way to the double-bearing alignment.

The Super Simplex into the manufacture of which was introduced to the trade the practice of hardened-and-ground sprockets. This unit also featured the rear-shutter mechanism.

The Simplex E17 which included a double shutter and a one-shot oiling system which embraced all moving elements except the intermittent movement.

The Simplex E-7 which included a double shutter and and radical advances as to constitute probably the most important milestone in projector manufacture.

On the sound reproduction front, Simplex brought out in 1938 the famous Simplex 4-Star sound system which was the first to utilize permanent magnet speakers. This was followed in 1950 by the radically new design of X-L loudspeakers for use in both enclosed and open-air theatres.

In 1954 Simplex scored another notable advance when it made available to the sorely-pressed motion picture industry a 4-track magnetic sound reproducer system.

Thus was staked out the long, long road leading from 1896 onward and ever upward to the magnificant motion picture theatres of today which, by comparison with the early nickelodeons, are truly palaces worthy to house a living, vibrant art that daily endows so many with so much for so little. Verily, a promise has been redeemed.

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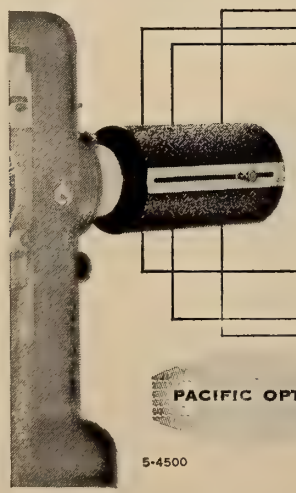
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PACIFIC OPTICAL CORPORATION

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Los Angeles 45, California

5-4500

"Unwept and Unsung"

(Continued from page 28)

technological accomplishments which make the box-office possible.

Producers, directors, and stars are well-known and widely publicized. And they should be. But it might also be an excellent device, if only from a promotional viewpoint, to stress the enormous contributions to the enjoyment of the audiences made by the technicians. There is a lot which could be said in such fashion as to interest, attract and please the audience. Perhaps fewer people would then take skilled studio and theater operation for granted. Maybe if the average theatergoer knew more of what goes on behind the technical scenes, he might better appreciate how much is offered him daily in the theatres of the land.

Other Industries Much More Perceptive

Other industries have done a somewhat better job along these lines relative to their skilled employees. Consider, for example, the airplane pilot. His skill and human value have been emphasized in the aviation industry. And even the motion picture itself has gone to great lengths to portray him favorably: the pilot appears as the star of many a story, play, or film of war in the skies or bravery and quick response to emergencies in peacetime. Thus the pilot has become a romantic and admired figure with the public. But who ever heard of the quick response to emergencies, the wise handling of unusual situations, and other desirable traits of the I. A. worker?

Many of these men working under difficult, monotonous, and occasionally highly demanding conditions could well be made the subject of an interesting and thrilling account. Today they remain "unwept, unhonored, and unsung". We still have to see the names of any competent, conscientious, and really unusual members of the I. A. appear in the bright lights over the marquee or on the flaunting posters in the lobby. Indeed, so far as the public and the press are concerned, these men, so essential to the entertainment world, are practically unknown.

Yet it is certain that authors with a gift for ferreting out the unusual and newsworthy parts of the life of the I. A. worker, and with the talent for describing them, could create great stories of the theater and its life built around these workers. One of the great operas was developed around a much lesser and vastly different figure — namely, a wandering clown. So it is curious that the showmen of the industry have failed to see the valuable theatrical material which exists right at their very doorsteps.

It is likely as well that, if the public were more impressed, through widespread publicity, with the skill and application which goes into making and showing a drama or comedy, they might like it all the more. The masterly technique of a great violinist or pianist is much advertised, and this certainly has a great effect upon music lovers.

All that has been said here should be regarded only as a calm comment but not as a bitter complaint. Anyone who knows I. A. men realizes that they do their jobs well and will continue to do so, with or without publicity. But we are all human — a pat on the back has never done anyone harm nor has it discouraged him.

Joint Industry-Craft Action Urged

The purpose of these observations is rather to urge the industrial leaders in the entertainment field not to forget those who bring beauty of form and color into the plays, who provide light and sound to the studios and to the theater audiences, and who in a thousand other ways contribute so greatly to modern entertainment. The public would be amazed, pleased, and gratified if it knew what these men were doing. The industry would thus gain further public respect and improved public relations. And firmer and friendlier coordination of industrial and labor efforts would result.

America — land of freedom, of opportunity, and of fine ideals — grows in power as each worker's stature is strengthened and as each man's talents, efforts, and accomplishments are recognized. The I. A. has done much and can do more to realize the American ideals through the crafts it represents. To it and to its sister unions will go the warm support and approval of all constructive, thoughtful, and equitable efforts they may make for the betterment of the very bone and sinews of their industry — the workers.

★ ★ ★

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Greetings and many thanks to the projectionists and stagehands who have contributed so much to the widespread use of Heyer-Shultz Metal Reflectors.

HEYER - SHULTZ, INC.
Cedar Grove New Jersey

Metal Reflectors – Quality Light

(Continued from page 24)

this refinishing process returns the reflective surface to its original flawless lustre.

To obtain maximum screen light, plus efficient performance, from your metal reflector, you will need to check the optical alignment of your lamphouse and projector head.

The most accurate method of optical alignment is by pinhole aperture. You can make your own pinhole aperture plate, as follows: a flat piece of sheet metal, brass or copper the approximate size and thickness of your regular aperture plates will suffice. Use any one of your present aperture plates for locating the pinhole dead center on the optical axis.

Hold this plate on your sheet of metal, and using an ice pick as a scriber, scratch an outline of the aperture plate and the aperture opening onto your sheet of metal. Then, using a straight-edge or ruler, scribe criss-cross lines within the aperture opening outline from corners to corners. Where these scribe lines cross is center of the aperture opening pinhole and it is here that you should punch, or drill if necessary, the smallest possible hole. If your sheet of metal is thin enough, you will be able to punch this pinhole with the ice pick.

Pre-Operating Procedure

After obtaining a properly located pinhole all that is necessary is to cut around the scribed outline of the aperture plate so it may be inserted into the aperture plate slot in the projector head.

With the metal reflector securely mounted in the reflector holder, and with a new carbon trim set up in the regular position, light up your lamp, start projector, throw the light on the screen and make a preliminary adjustment by reflector movement forward or backward, as well as up, down and sideward. Sometimes it is necessary to adjust the arc also, in order to obtain proper screen light.

If this is required, reset or remark the arc indicator card at once. Because of metal expansion from heat, all optical alignment adjustments, whether visual or by the H-S pinhole method, should be made when the reflector is hot.

CAUTION: do not clean your metal reflector until it has been heat-treated by at least 4 hours of running time in the arclamp, and then clean according to instructions in booklet supplied with every installation. This heat-treatment is necessary because it hardens the plated surface and thus makes it more resistant to scratching during the cleaning process.

★ ★ ★

The Future of Theatre TV

(Continued from page 20)

cooperation has been most valuable in its development.

I believe that the Tele-Sessions idea has a great future because of its tremendous economy compared with the cost of bringing personnel long distances to attend sales and similar meetings. Facilities can be provided for as little as $2 per important viewer attending a company session. The cost of the program varies according to how elaborate the production is ranging from a few thousand dollars upward.

Tele-Sessions shows can originate anywhere—remote from the field, or from the studio, or the theatre, or even from the White House. Every type of meeting place has been served—hotels, theatres, Tv stations and sponsor-company office. Permanent Tv projection installations and mobile projectors especially installed at the meeting place have been used. In the telecast of the New York Dress Institute fashion show, we utilized closed-circuit *large-screen color* Tv.

100-Odd Theatres in 54 Cities

As the score now stands, we have more than 100 theatres hooked up in some 50-odd cities. There are at present 250 cities where Tv broadcast stations exist, and in nearly 200 of these cities there are Bell Telephone facilities, either coaxial cable or microwave relay towers, that can be used to transmit special closed-circuit Tv shows as well as regular network programs. In many of these cities there are theatres that stand to profit by installing theatre Tv equipment.

The general public is the best customer for closed-circuit Tv at the movie box-office.

This year TNT signed a three-year contract with the Metropolitan Opera Co. to present its opening-night program over a nation-wide closed-circuit network. In the past we have presented such outstanding boxing matches as Marciani *vs.* Charles, Robinson *vs.* Turpin and many of the games of outstanding college football teams, such as Notre Dame, Princeton, Columbia, Yale and others. It is my firm belief that theatre Tv can bring new box-

Greetings

to the I A T S E

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Manufacturers of fine visual and sound equipment for ALL methods of reproduction.

office life to the motion picture theatre, which in turn means additional employment for motion picture and stage craftsmen.

Reception of these Tv programs in the theatre is accomplished by either the RCA direct-pickup, direct-projection system or by the instantaneous film recording, developing and projection process. Both these procedures have been described in detail in IP.

★ ★ ★

Keeping in Step with Progress

(Continued from page 12)

parts should not be dismissed lightly because these are the first essentials of any emergency protective system!

Another feature of RCA Service consists of a plan of providing for the furnishing of required parts and tubes at a flat low-cost yearly charge. This maintenance plan has been extremely popular with projectionists and exhibitors for many years, and has grown steadily each year. With this plan in force, quality performance is further insured by safeguarding equipment parts from reaching the point of excessive wear and consequent lowering of sound quality. Exhibitors are protected against major expenditure in the way of part or unit replacements.

Long-Range Planning for Future

Exhibitors are aware that whatever method of sound and projection they choose for their theatre, now or in the future, an RCA service expert will render the same skilled service and attention. The reason for this stems from a few basic concepts on which the service organization operates, such as keeping pace with the latest developments in motion picture presentation; keeping field personnel constantly informed of the many newborn techniques and methods of theatre servicing, and making certain the field engineer is continually aware of the importance of changing developments affecting exhibitors and their theatres.

For the past 25 years, RCA Service Company has kept pace with and contributed to the latest developments in motion picture presentation. At RCA, theatre service is an exact science, dependent upon thoroughly trained field engineers with years of practical experience and equipped with the most modern test equipment available. Through its engineering and research groups, RCA Service Company has greatly aided in the progress of the industry and the benefit of the exhibitor.

RCA Service Company has joined with other divisions of Radio Corporation of America, including the David Sarnoff Research Laboratories at Princeton, N. J., in a coordinated campaign to place its theatre service facilities in a position to better serve its exhibitor-customers all over the country. As rapidly as new ideas on sound and projection are introduced, field personnel have this information in their hands, ready to apply them as the situation demands. RCA Service people have kept in close touch with all developments in the theatre industry. They will continue to pass along their ideas and knowledge so that the exhibitors and projectionists will receive full benefit from them.

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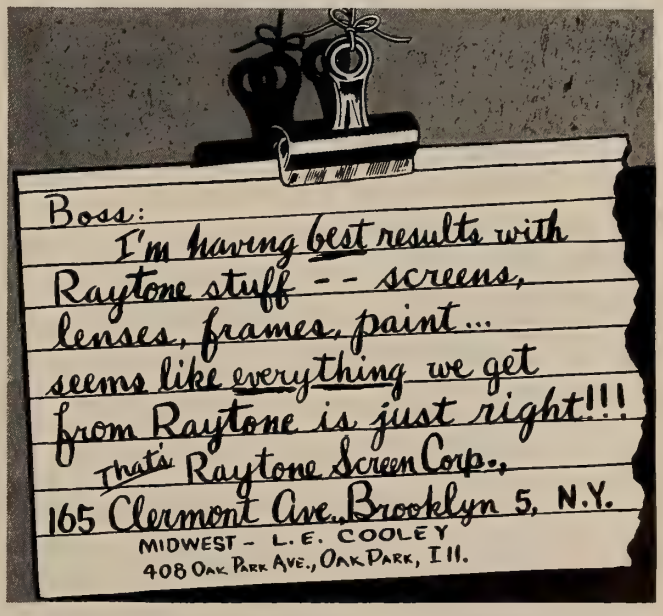
The Carbon Arc: Vital Factor In Production and Projection

(Continued from page 17)

of their ultimate desirability but rather because they are in the range being obtained by some outdoor theatres. The rotating-type reflector lamps and the rotating-type condenser lamps can illuminate screens of 45 to 70 feet with to a screen brightness of 4 to 6 foot-lamberts.

Wide-Screen Ratios, Screen Image Areas

Although the data contained herein are limited to projection from a *standard* 35-mm motion picture film aperture of 0.600 inches X 0.825 inches and thus are not directly applicable to other film aperture sizes and picture aspect ratios, rough estimates can be made in some instances. For example, the outputs of the various 35-mm film projection systems may be redistributed by



Greetings...

I. A. T. S. E.

AMERICAN CINEMATOGRAPHER
The Magazine of Motion Picture Photography
HOLLYWOOD • CALIFORNIA

optical means over various sizes and shapes of film apertures and projection screens. If this be accomplished with minor or known losses, the results expected can be closely approximated.

The requirements of CinemaScope, which employs a standard projection frame but a 2.55 to 1 picture aspect ratio, can be calculated once the information on the transmission and reflection of the added accessories employed is known.

Except for the optical losses in the added anamorphoscope lens which functions to produce a two-fold expansion of picture *width* during projection, this expansion would produce a *two-fold increase in picture area* and *reduce by one-half* the available screen brightness *obtainable with a normal unexpanded image.* Therefore, the light requirements for the same screen brightness would be almost double those of *conventional* 35-mm pictures on an *unexpanded* screen of the same type—that is, if the CinemaScope ratio of 2.55 to 1 be observed.

The new carbons which have been developed will produce considerably more screen light; their successful utilization, however, will require suitable lamps and other projection equipment.

New Carbons Require Suitable Projection Units

At present, acceptable levels of screen brightness for all projection systems are available, provided the equipment necessary to operate the higher capacity carbons is installed; and provided the entire projection system, including lenses, mirrors, condensers, and port glasses, is in exact adjustment and in good clean optical condition.

It is quite true that "If the picture isn't on the film, you can't put it on the screen." Also true is that if the picture *is* on the film the responsibilities of the projectionist parallel those of the cinematographer. He must balance his auditorium illumination so no bright colored objects will interefere with the picture, and his projection light source must be of the correct intensity and quality.

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Prescription for Good Projection

(Continued from page 8)

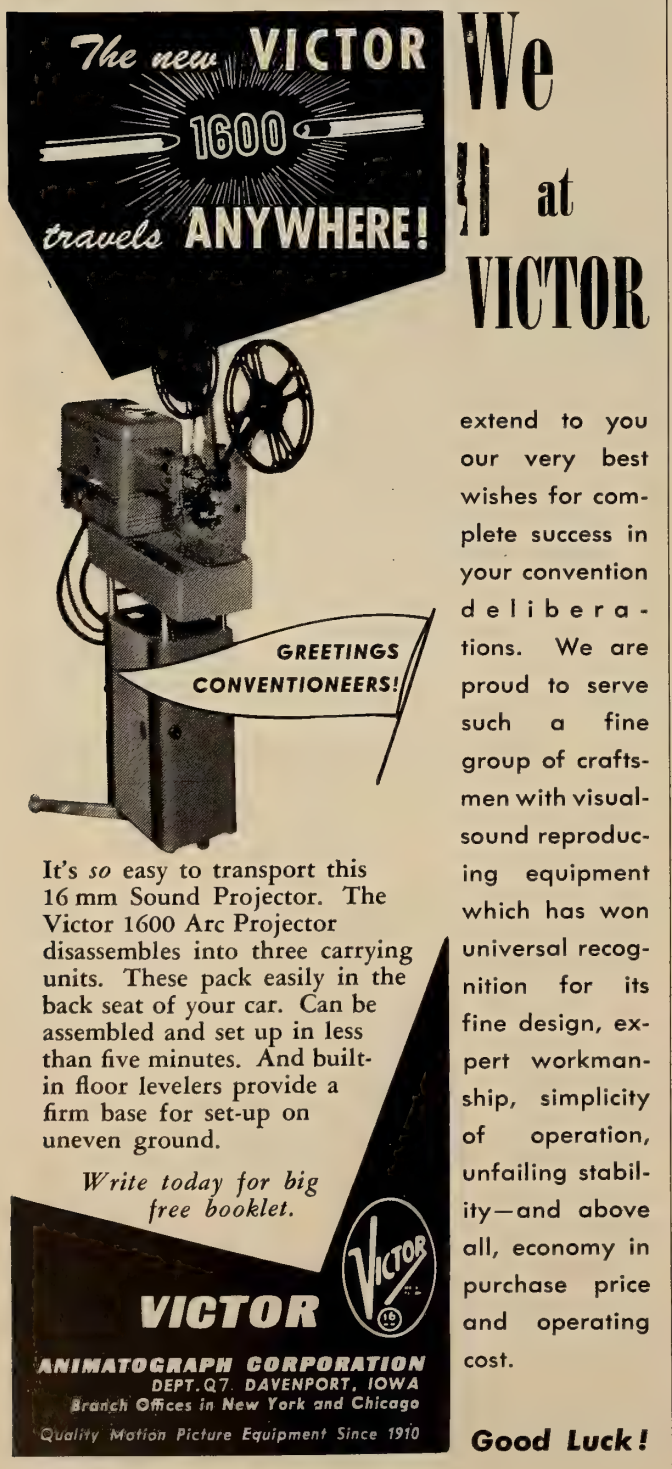
light when it is not required. If you have one of the new high-power lamps, the grid can be slipped into the holder for the heat-reflecting glass. It will be quickly removable. The total area of the holes in the metal, whether round or square, should be about equal to the area of the metal between them.

The only way to be sure your light is correct is to have it measured. The writer was caught this way not so long ago. The crime took place in a small theatre right in the middle of a large field on a summer day. The patient complained bitterly of flicker. All the equipment was the best, and everything was in good condition. It took sometime before someone brought a meter along and found that there were 60 foot-candles on the little screen! Coming straight in from the bright light outside, the picture didn't look too bright at all. It just flickered.

Just How Good Is Your Sound?

Now as to the sound. How is it? Of course there are problems with an unwilling patient. We have all heard of the deaf manager, just as we have heard of the one-eyed theatre owner who "did not believe in 3-D." But even a deaf man can be treated with tact. People with sensitive ears can be driven out of the theatres just as easily as the deaf ones, so don't forget the bedside manner and the bedside attitude. I mean, of course, the constant watch that the volume and quality are just as right as they can be.

Sound equipment these days has improved in basic design, but it is often true that stereophonic additions have been somewhat hastily and thoughtlessly installed,



so that it is not nearly so convenient to operate as are the better designs of old equipment. This means increased watchfullness.

Let us take flutter as a first example. Many of the older reproducers, both for film and records, had a high flutter output. This distortion was inherent in the design. Nowadays, it cannot be excused. The SMPTE and the Motion Picture Research Council have agreed on standards, and the better manufacturers produce equipment which performs much better than the standards if the equipment be in good condition.

If it be in good condition! Here again your judgement and experience come into play. Was that a sour note from the magnetic penthouse reproducer? Listen again. Yes it was, and at the same time perhaps you heard the film rub on the reel edge in the upper magazine. That's it! Every time that bent reel rubs the film, the sound goes just a little sour. No specialist needed for that one. Let's get some new reels at last!

Delicate Flywheel Balance

Another cause of such trouble could be anything touching the flywheels (impedance drums) in the reproducer. These flywheels look solid and heavy and as if they could bulldoze their way through trouble, but just try flicking one with a feather and listen to the result. If they were not so solid and heavy and free-running, they would not work at all.

Non-sync turntables are often at fault these days. Nobody needs telling what happens when the record is a "swinger" with the hole not in the center, but similar trouble can be caused when a cheap turntable motor, which is good enough at 78 rpm, is run at 33⅓ rpm for IP records. The flywheel effect is much less at low speeds, and the services of a specialist are often required, probably to replace the turntable.

Now suppose there is trouble with the volume of the sound. Your unaided eyes and ears will often help you find the trouble faster than can any specialist with a meter. Just to save red faces you will see that the power is really on, and that a piece of that worn advertising film didn't get stuck half way across the light beam from the exciter lamp.

Check Loudspeakers Frequently

Now lets go down to the stage. Sound goes just a little bad sometimes for very simple reasons. After any work on the stage, the workers swear that they put the loudspeaker back "just in the same place." But is it pointing down the center of the theatre? No? They put it back in the same place all right, but the high-frequency unit is pointing right up at the ceiling. This is easily put right; but it is often not realized that, with stereophonic sound, the right-hand speaker must be heard at the left side as well as at the right.

The aiming of loudspeaker units here can be really critical. Very careful listening tests are necessary and should have been made during the tryout period to determine the best positions. This should be a job for the "golden ear boys," but if they had to skimp it, your own ears aren't so bad either.

Now, as a good doctor, you'll keep your operating room clean and tidy, and essential tools at hand. You should listen to the stage loudspeakers now and again to make sure nobody has pulled out a plug on one of them. Try to insure that there is enough space to operate comfortably. Over the years, an inconvenient switch or an equipment cabinet you have to walk around twenty times a day, can wear out a lot of patience.

Lastly, as a good doctor you know when some or all of your equipment is dying of old age. You'll never get good sound out of old soundheads or a good picture out of a projector which still has a hand-crank extension on it. Live with it if you must for a time, but don't forget that the paying cusomers appreciate quality.

★ ★ ★

GREETINGS

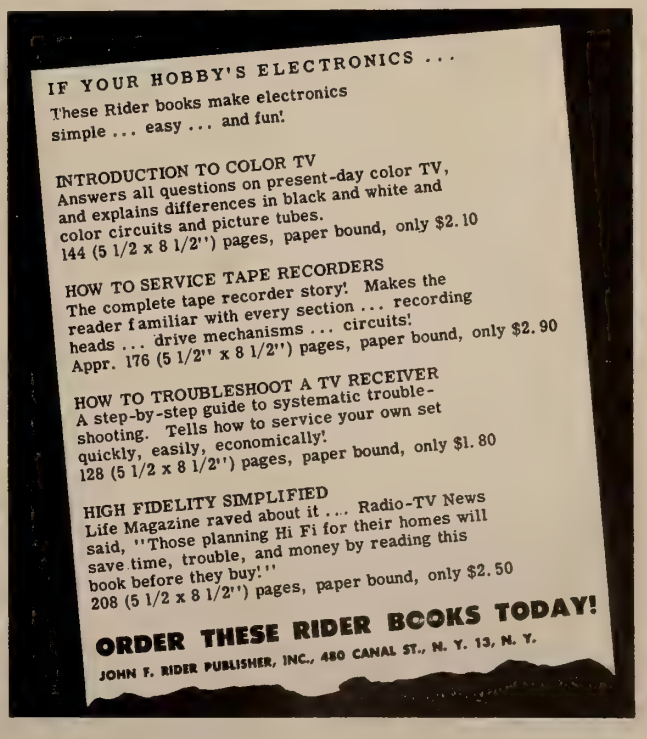
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"Magic Lantern" to Stereo Sound

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cisco" and "Mutiny on the Bounty," Motiograph unveiled its now famous Model K projector. It soon became one of the best known projectors of the time. The one-piece shutter was a feature, as was the improved mechanism and base. There was a change from single to double bearings. A faster framing device was located in the front of the mechanism.

Motiograph's present type of sound system was adopted in 1938. Radical improvement became possible when the signing of an agreement with ERPI permitted full use of Western Electric's many patents on sound-reproducing systems.

Fortunately, the outbreak of World War II found Motiograph in the midst of its greatest expansion program, and it required little effort to convert the enlarged facilities to the war effort. Because most of the equipment was modern and capable of producing highly-precisioned parts, it fitted in unusually well with the requirements for turning out essential war materials.

Throughout the war, the major portion of Motiograph's production, with three plants on a three-shift basis, was for Uncle Sam, although some projectors continued to be turned out for civilian use as late as August 1942. Subsequently, Motiograph continued the production of projection and sound-reproducing equipment for training purposes by the armed forces, and took on the production of secret war work.

The production of such equipment naturally gave Motiograph a head start in the development and production of the equipment required by all the new processes of today.

The new postwar projector, known as Model AA, was formally announced in November, 1946. It embodied radical developments and improvements in performance and operation which resulted not only from the work done by an experienced staff of projection engineers, outside consulting engineers and industrial designers, but also suggestions made by projectionists from coast to coast and the entire organization of Motiograph dealers, the men on the installation and service firing line. It featured simplicity of operation and exceptional screen values. It also afforded ease of repair and adjustment in the field.

Complete Drive-in Equipment Ready by 1948

A complete line of drive-in theatre sound systems and in-car speaker equipment for drive-ins of all sizes was announced by Motiograph early in 1948. Hi-Power 115/230-ampere generator sets were an addition to the Motiograph line that same year. The Motiograph 75/115-ampere, high-intensity, reflector-type arclamp was developed in February 1949. In June 1951, Motiograph announced that it would thereafter manufacture and assemble the famous Victor Animatograph line of 16-mm sound motion picture apparatus.

With the advent of 3-D and wide-screen presentation early in 1953, Motiograph was ready with 3-D interlock equipment for any make or model sound-reproducing system; 25-inch diameter magazines for 3-D projection to fit any make or model of projector and sound reproducer; 85-ampere and 115-ampere continuous-duty, 3-D generators designed particularly for interlock projection systems, and a full line of stereophonic sound systems to handle all existing recording techniques.

Equipment for all Advanced Exhibition Techniques

In early 1954 Motiograph introduced the Motiograph AAA projector which permits the presentation of all types of prints without an interchange of sprockets or other components. Coincidently came the Motiograph AAA Penthouse Reproducer designed to reproduce single —or 4-track magnetic sound prints.

The Motiograph dealer organization is comprised of independent theatre supply men chosen in accordance with rigid standards.

The industry now has come to another important milestone of development in screen entertainment, and Motiograph, approaching its 60th anniversary, can look back on every step in this development with pride of accomplishment for Motiograph was there when the whole thing started!

★ ★ ★

Enjoy full profit from CinemaScope shown in its full appeal!...use only Bausch & Lomb Lenses created specially for CinemaScope

Greetings . . .

And Thanks

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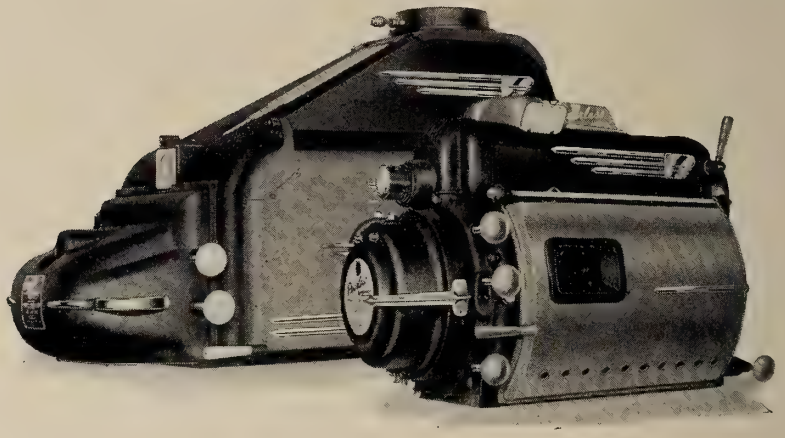
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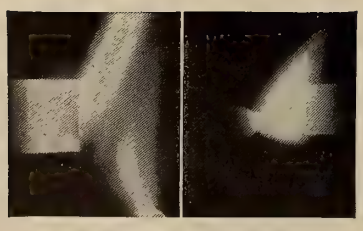
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INTERNATIONAL PROJECTIONIST

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JAMES J. FINN, *Editor*

JAMES MORRIS, *Associate Editor*

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MONTHLY CHAT

IF THERE are any projectionists who don't realize their critical importance to the industry in these days when new processes are running wild, their attention is called to the following item which recently appeared in *Film Daily*:

"Just to illustrate how tough it can be for the average theatre man to handle the new types of equipment and lenses with which he must be equipped to present the best in shows, here is a true story about a recent test of various lenses conducted by six optical experts.

"These men are acknowledged to be experts in their field. One of them yelled up to the booth to change the focus of one of the lenses just a tiny bit. *Before* the expert in the booth had a chance to touch the lens and make the suggested change, the man who had asked for it yelled: 'That's it! Don't touch it again. It's perfect now.'"

This is the kind of situation we run into in the theatre today. The so-called "new processes" have awakened the industry to the technical resources it possessed for years but never bothered to use until Tv was driving the exhibition business to the wall. At the same time, exhibitors are confronted with a situation where they must select new and often unstandardized lenses, screens, and sound equipment even though they have little or no technical knowledge.

Competent Advice Available

Where can an exhibitor get competent advice in such a situation? Granted, he can receive information and assistance from theatre supply dealers and their technical men. But is this enough? A man who sells would not be doing his job properly if he didn't push his own products.

The obvious person to consult is the projectionist—the only technically-minded person in and about the theatre. He has had years of experience in judging, for instance, the performance of lenses, and he probably has well-founded knowledge of what size and shape of picture is practical in a given house.

Another segment of the film industry that is beginning to realize its dependence on the projectionist is the production field. This is shown by 20th Century-Fox's announcement that it has prepared a special reel of film which is supposed to explain to projectionists exactly what should be done to obtain the best results from CinemaScope film. This reel is said to suggest methods of proper handling of sound levels, keeping the picture in focus, *etc.*

Since most of the difficulties in handling CinemaScope film are *not* the result of carelessness in the projection

(Continued on page 34)

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VOLUME XXIX AUGUST 1954 NUMBER 8

An Evaluation of Optical Sound

By ROBERT A. MITCHELL

Despite competition from magnetic sound, optical reproduction remains the most important method of sound reproduction in motion picture theatres. This is the first of two articles which point out certain advantages of optical soundheads.

FOLLOWING many months of much intense aural and visual tests, the writer is convinced that predictions that photographic (optical) sound is a "dead duck" are quite wrong. The longer he listens to magnetic sound reproduction the greater is his appreciation for regular optical-track sound reproduction, which is comparatively trouble-free and certainly far less expensive.

Right at the outset, let's get this magnetic sound business straight. Studios prefer magnetic recording on account of its low noise-level and high fidelity *when properly handled.* The magnetographic tracks must be at least 7 mm (0.276 inch) in width for the best sound, and the magnetic recording heads, which wear out rather quickly, must be in tip-top condition. In addition to these advantages, magnetic tracks make possible immediate playback because no processing of any kind is needed.

Delicate Adjustment Needed

But we are talking now about *recording*, not reproduction. If magnetic film is very carefully handled and reproduced in carefully constructed and operated reproducers, it will indeed provide excellent reproduction. This is a far cry from the narrow CinemaScope tracks which get banged about a bit in theatre use and must go through the entire film-course of picture projectors.

From the re-recorded, or "dubbed," magnetic tracks photographic sound negatives are made for standard release printing. So with the advent of magnetic recording, optical reproduction is better than ever. A number of photographic steps have been eliminated, hence photographic distortions have been minimized and "ground noise" reduced to the vanishing point. Thanks to the vocal magnets, modern photographic sound reproduction would be hard to beat, *and cannot be excelled for reproduction in theatres under* NORMAL *working conditions.*

Unlike the designers of CinemaScope film, the pioneers of optical recording showed exceedingly good judgment when they standardized the width of the photographic soundtrack at 0.1 inch (2.5 mm) and the rate of film-travel at 1½ feet or 24 frames per second. These specifications are more than adequate for high-fidelity optical sound. (Fig. 1).

Accidental Erasure

Narrow tracks is not the only defect of CinemaScope sound. All magnetic tracks are subject to partial erasure in normal use and to the accidental pickup of noise, defects much more serious than the noises caused by scratches and splices in optical tracks. ("Push-pull" optical recording largely does away with this slight nuisance, however.) The magnetic multiple-unit reproducing heads get worn and must be replaced frequently at high cost (just as worn phonograph needles require changing) if attenuation of the higher frequencies is not to result in "mumbly" speech. There is no need to speak here of splicing difficulties experienced with picture film carrying four magnetic tracks striped on the base-side of the film stock.

Sound prints of the standard optical-track variety are much less expensive and more quickly processed than magnetic prints. When the picture is plain black-and-white no special thought need be given to the sound-

track during machine development. In the case of multilayer dye-coupler color films it is only necessary to redevelop the soundtrack to a silver image.

Even this simple extra step may be eliminated by employing blue-sensitive photoelectric cells in projectors. Ordinary photocells are responsive to infrared rays transmitted by the colored dyes, but blue-sensitive cells, responsive to shorter wave-lengths blocked by certain combinations of dyes, give a satisfactory signal output with dye tracks.

Technicolor Sound Tracks

Technicolor imbibition-printed color films pose a tough problem with regard to optical reproduction. Although the blurriness that results is too slight to spoil the clarity of the picture-images, a soundtrack printed by dye-imbibition would give very poor sound. This is why all Technicolor movies are printed on regular photofilm having a silver soundtrack.

With silent movies, Technicolor imbibition prints were made on simple gelatine-coated celluloid, a type of stock much less expensive than raw stock coated with photosensitive emulsion. Even so, Technicolor prints having silver-image soundtracks are not nearly so high in price as multilayer dye-coupler color prints.

A magnetic reproducer is simpler than an optical reproducing system. It needs no exciting lamp and no optical tube containing a slit and several lenses. With no exciting lamp, no exciter power-supply is needed; and with no optical tube, no photoelectric cell, condensing lenses, mirrors, *etc.*, are used. Also, no D.C. voltage is required for magnetic reproducing heads.

But in spite of this simplicity, the optical method is less costly, more stable in operation, and far more likely to give consistently good results.

Optical Equipment Durable

The optical tube of the photosound reproducer is analogous to the needle of a phonograph and to the iron "brushes" of a magnetic reproducer. An important difference is that the optical tube never gets dull or wears out. Properly cared for, the optical tube of a standard soundhead will last a lifetime, only requiring a check on focus every month or two.

The optical tube produces a "scanning beam" which cuts the soundtrack. This is formed from the light emitted by the exciting lamp, and is a very thin line of light as long as the the soundtrack is wide. The thinness of the beam is very important. The higher frequencies of recorded sound assume the form of delicate, thread-like lines and striations in the soundtrack. If such narrow lines are to modulate the scanning beam passing through the film, the lenses of the optical tube must be of good quality, and the focus must be *very sharp.*

Forming the Scanning Beam

There are different methods of forming the scanning beam, hence different types of optical tubes. In the early days the filaments of exciting lamps were made of a single strand of tungsten wire tensioned at one end by a steel spring to prevent sagging. With this type of exciter, it was only necessary for the lenses of the optical tube to focus a reduced image of the straight, white-hot filament on the soundtrack.

To avoid fadeaway of light at the ends of the scanning line, due to the cooling action of the filament supports, only the middle part of the filament was imaged on the film. The scanning beam was 0.084 inches (2.13 mm) in length and about 1 mil (0.001 inches or 25 microns) in width at the point where it penetrated the soundtrack.

This method had two serious disadvantages: the projectionist found it necessary to refocus the optics every time a new exciting lamp was inserted, and the vibration of the running projector caused the long, thin, stretched filament to vibrate like a rubber band. As a result, the sound was marred by "whiskers."

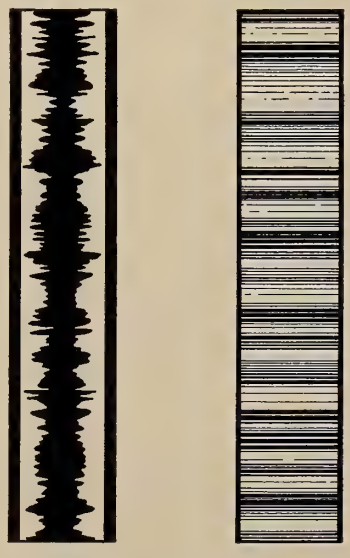


FIGURE 1

Better Exciter Lamps

To overcome these drawbacks, the glowing exciter filament was focused on a mechanical slit, and a reduced image of the mechanical slit focused on the film. This permitted the use of coiled-filament exciting lamps and eliminated the danger of raspiness caused by filament vibration. Both the condensing lens, which concentrated the light on the slit, and the microscope-objective, which focused the slit on the film, were held in fixed position in the optical tube with the mechanical slit between the two lenses.

This system, resembling the optical layout of a motion picture projector, worked perfectly with variable-density soundtracks, but not with variable-area tracks. The coils of the filament focused on the slit resulted in variations of brightness along the length of the slit-image. When the sawtooth patterns of variable-area tracks moved back and forth across these brightness variations, distortion appeared in the reproduced sound.

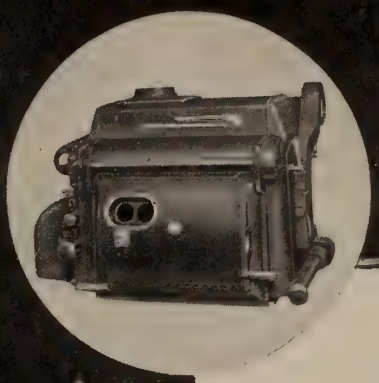
To eliminate these distortions, RCA introduced the so-called "stereopticon" type of optical tube in which the slit is placed close to the condensing lens, and the image of the exciter filament is concentrated on the objective which focuses the evenly illuminated slit on the film. This type of optical tube is in common use today.

Scanning Beam Dimensions

The slit-image produced by the older optical tubes was 1 mil (25 microns) wide, while modern American optical tubes produce a 1¼-mil (32-micron) slit-image for increased sound output and lower ground noise. Attenuation, or weakening, of the high frequencies (2,000 to 10,000 cycles per second) by the wider slit is not appreciable, and the 25% increase in "gain" is very desirable. With a lower volume-setting the projectionist obtains the same level of sound, as he did formerly at a higher setting with the narrower slit. Photocell hiss is reduced, and very fine scratches on the

(Continued on page 33)

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The Optics of CinemaScope

By RICHARD ALTMAN

Scientific Bureau
Bausch & Lomb Optical Company

ALTHOUGH many general articles on CinemaScope have appeared, relatively few have concerned themselves with the optical principles involved. The more familiar type of lenses such as those used in projection of motion pictures enlarge the image on the film and transfer it to the screen.

The picture on the screen is the same as that on the film (Fig. 1) only the size has been changed due to the magnification of the projection lens. The magnification is the number of images on the film needed to cross over the image, and will be the same in all directions if the picture on the film is to be reproduced faithfully on the screen.

In CinemaScope the picture on the screen is different from that on the film (Fig. 2). Circles on the film are projected oval, showing a difference in magnification between the horizontal and vertical directions. The lens which accomplishes this is called an "anamorphic" because it "reshapes" the image.

Alteration of Image by CinemaScope Lens

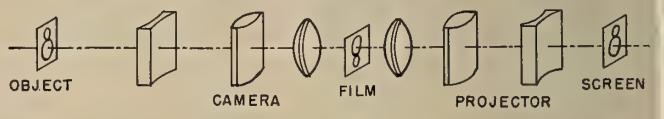
In the illustrations the lens is shown projecting at three times magnification. When a CinemaScope lens is added the magnification remains at three times in the *vertical* direction but is now *six times* in the *horizontal.* The focal length of the projection lens is thus effectively halved in the horizontal direction, while remaining unchanged in the vertical direction.

The complete optical system for CinemaScope includes a conventional camera lens plus a CinemaScope attachment for recording a squeezed image on the film, and a conventional projection lens plus a CinemaScope projection attachment to expand the image to normal proportions on the screen. Since all CinemaScope pictures are photographed in a squeeze ratio of two times, they must be projected by an anamorphic attachment fixed at two times expansion so that the final picture will not be distorted.

CinemaScope attachments must have a high degree of optical correction in order that the quality of the projected image will not suffer. A cylinder lens system was chosen by Bausch & Lomb over a variable-type prism system as affording the best quality imagery at any given squeeze ratio. In addition, the projection attachment must work well with lenses of various focal lengths.

For instance, the anamorphic attachments must have sufficient diameter to maintain the optical speed of long-

FIG. 3. CINEMASCOPE OPTICAL SYSTEM



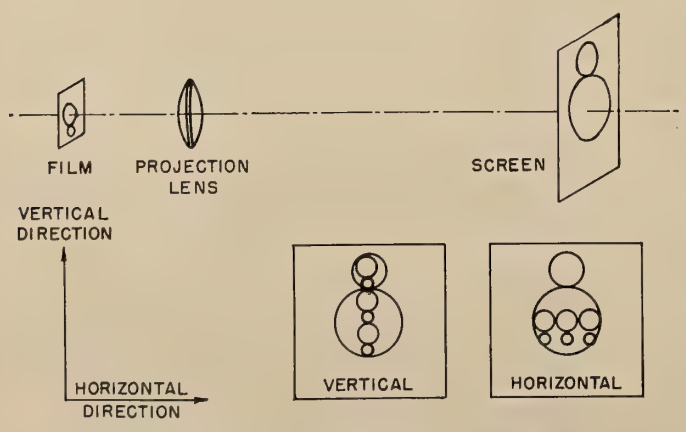
focal-length lenses and yet allow enough light to get to the corners of the screen when used with short-focal-length lenses. A single attachment, meeting these mechanical specifications would require a very bulky lens.

CinemaScope Lens Not a Corrective Unit

For this reason Bausch & Lomb supplies two forms of CinemaScope projection attachments (Fig. 4). Projection attachment I for lenses of 3- to 5-inch focal length in 2.781-inch barrels, and attachment II for lenses of 5- to 7-inch focal length in 4-inch diameter barrels. The projectionist is thus assured of top quality projection with a minimum of extra bulk to handle.

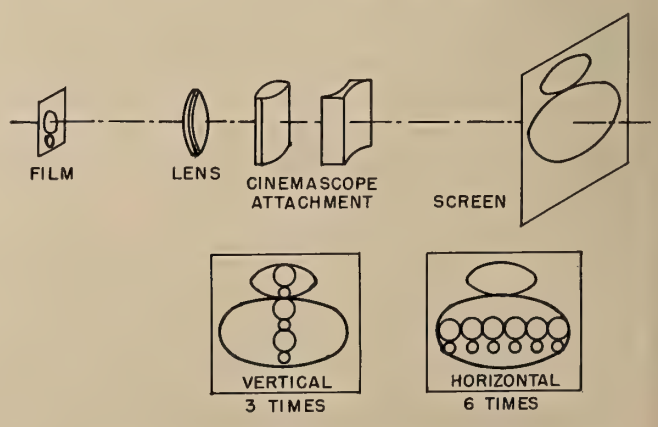
Furthermore, the attachment *will not* correct any defects that already exist in his projection lens. In fact, those defects are more noticeable when the CinemaScope attachment is added because of the extra magnification introduced in the horizontal direction. For this reason, lenses that may appear to give an acceptable image in normal projection may give poor imagery in Cinema-

FIG. 1. MAGNIFICATION OF FAMILIAR TYPE LENS



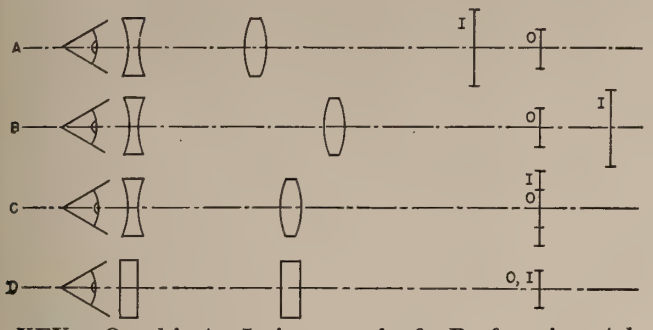
Three times magnification in both vertical and horizontal directions.

FIG. 2. CINEMASCOPE MAGNIFICATION



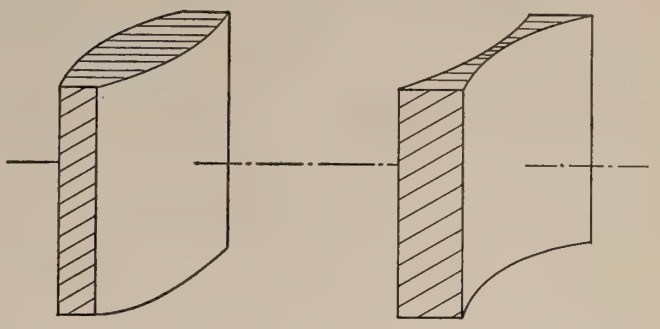
The CinemaScope attachment raises the horizontal magnification two times

FIG. 5. SETTING CINEMASCOPE LENS FOR "THROW"



KEY: O—object; I—image; A & B—focusing telescope; C—image on object; D—flat plates of the glass-image on object.

FIG. 6 CYLINDRICAL ANAMORPHIC LENSES



Cylindrical anamorphic lenses are the natural result of combining C and D of FIG. 5.

Scope projection. It is essential that top-quality projection lenses be used to obtain the best projected image.

The CinemaScope attachment and projection lens are locked together and focused as a unit in the normal manner. It is necessary to preset the CinemaScope attachment for the projection throw. This setting is completely independent of the focal length of the projection lens. It can be likened to the adjustment of a telescope for objects at different distances.

By changing the spacing between the elements (Fig. 5) the image may be formed either in front of Fig. 5A, behind Fig. 5B, or on the object itself, Fig. 5C. A CinemaScope lens forms the image on the object. The main difference between a CinemaScope attachment and a telescope is that in the former the magnification must be confined to the horizontal direction. In the vertical direction the image appears unchanged in size and position—like when the object is viewed through a simple flat plate of glass (Fig. 5D). In both directions the image is on the object so that it appears sharply focused. A natural result of combining Figs. 5C and 5D is a cylinder lens system which has straight sides vertically and curved sides horizontally.

C'Scope Lens Acts Like Reversed Telescope

Actually the CinemaScope lens is used like a *reversed* telescope in that when the picture is taken it gives a smaller rather than a larger image. Because the image is smaller, more of the object can be put on the same size film. In projection the same lens expands the image because the direction of the light through the lens is *reversed*. The projected picture contains *more of the object*, which means a larger projection screen is needed.

CinemaScope gives a screen size 2.55 times as wide as it is high wiht the anamorphic squeeze ratio of 2 times. The whole film frame is used for picking up the maximum amount of light. If a non-anamorphic system is used to give the same screen dimensions as CinemaScope, there will be a loss of light on the screen. The ratio of the amount of light on the screen for an anamorphic system as compared with a non-anamorphic system giving pictures of the same dimensions is the squeeze ratio of the anamorphic lens. That is, the amount of light is greater for larger squeeze ratios.

For small squeeze ratios the gain in light may not be sufficient to warrant the added expense of using anamorphic lenses. The gain in screen illumination and the reduction of film grain are the two major optical advantages of an anamorphic over a non-anamorphic system.



B. & L. CinemaScope anamorphic projection attachments.

★ ★ ★

Do You Remember - - August 6, 1926?

THE death-knell of the old silent motion picture in the theatre exhibition field was sounded just 28 years ago when on August 6, 1926, John Barrymore appeared in *Don Juan* at the Warner Theatre in New York City. Barrymore, the star, and others of the cast of *Don Juan* were inaudible, however, since this film offered only a "fully synchronized and recorded musical score." But on a surrounding program of short subjects opera and concert, performers sang and played, the sound being played back from discs synchronized with the pictorial imagery.

Sponsoring this historical film exhibit were the Warner brothers—Jack L., Sam L., Albert W. and Harry M.—whose activity in the motion picture business goes back to 1906, when they opened their first theatre at New Castle, Penn. Subsequently, the Warners became top-flight producers of silent feature pictures, their steady progress toward their present eminence in the film world being marred only by the death of Sam Warner.

The equipment used for the first public exhibition of

WARNER BROS. PICTURES, INC.
in association with
THE VITAPHONE CORPORATION
Present
VITAPHONE
and
JOHN BARRYMORE *in* *"Don Juan"*
v
VITAPHONE PRELUDE

Hon. Will H. Hays
President of Motion Picture Producers and Distributors of America welcomes VITAPHONE.

The New York Philharmonic Orchestra
Henry Hadley conducting, Overture from "TANNHAUSER", Wagner.

Marion Talley
By arrangement with the Metropolitan Opera Company, Caro Nome from "RIGOLETTO", Verdi, or "Home Sweet Home."

Efrem Zimbalist and Harold Bauer
Variations from "KREUTZER SONATA", Beethoven.

Roy Smeck
in "HIS PASTIMES"

Anna Case
"LA FIESTA", supported by the Cansinos and Metropolitan Opera chorus. Accompanied by the Vitaphone Symphony Orchestra, Herman Heller conducting.

Mischa Elman
Josef Bonime, accompanist
"HUMORESQUE", Dvorak.

Giovanni Martinelli
By arrangement with the Metropolitan Opera Company.
Vesti la Giubba, from "I PAGLIACCI", Leoncavallo.
Accompanied by the NEW YORK PHILHARMONIC ORCHESTRA.

Incidental music to the above numbers played by members of the New York Philharmonic Orchestra, Herman Heller conducting.

Program Subject to Change Without Notice

Here is a reproduction of the fateful Vitaphone program that revolutionized the motion picture business just 28 years ago this August 6 of 1954.

"talking pictures" on that sultry August night 28 years ago was the famed "Vitaphone" unit which, when favored by good reproducing fortune, effectively synchronized sound and vision and offered a realistic audible film presentation. Vitaphone was the outcome of supplemental extensive development work, following years of pioneering work by unsung individuals, by Western Electric Co. and Bell Telephone.

To say that *Don Juan* revolutionized the motion picture business is putting it mildly: history was made that August night; and the motion picture industry, too, was made (and very nearly unmade) at a time when slumping box-office receipts threatened the movies' theretofore vise-like grip on the entertainment preference of the theatre-going public.

The First "All-Talking" Picture

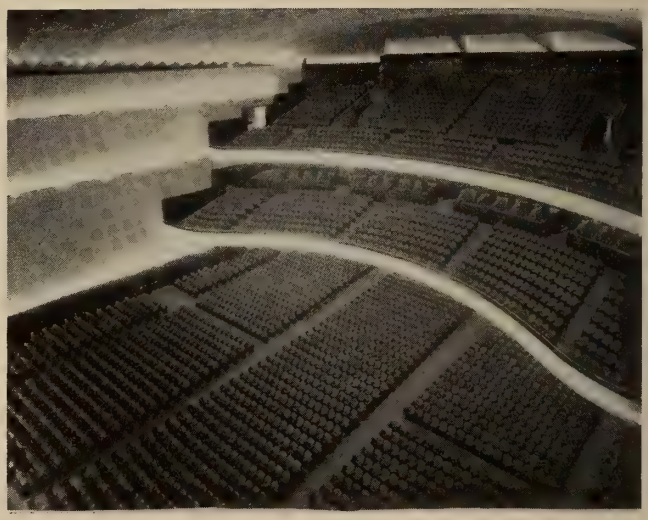
Oddly enough, it wasn't until 1928, two years after *Don Juan*, that the first "all-talking picture" (as they were then termed) was publicly exhibited, also by the Warners; although six months after Don Juan, William Fox and Theodore Case introduced the Movietone Newsreel, a sound-on-film process.

The scientific development of sound pictures traces its ancestry to, among several other *film* pioneers, Dr. Lee De Forest, the latter by means of his development of the "audion" (three-element) amplifying tube. In 1887 Edison wrote:

"The idea occurred to me that it was possible to devise an instrument which should do for the eye what the phonograph did for the ear, and that by a combination of the two all motion and sound could be recorded and reproduced simultaneously." Two years later, on October 6, 1889, Edison gave the first demonstration of a small motion picture mechanically synchronized with a phonograph record. By 1913 Edison has made nearly twenty brief motion picture subjects for the "Kinetophone," as the Edison device was known, and these were shown in a number of theatres in various parts of the country.

De Forest developed a sound-on-film method of synchronizing sound with motion pictures which he called "Phonofilm." Demonstrations of Phonofilm were given in De Forest's Highbridge, New York, laboratory in 1921; and in 1923 and 1924 he gave demonstrations of Phonofilm in the Rivoli and Rialto Theatres, N. Y. City.

Lest you suspect that our friends in distant lands are not fully conversant with technological advances—visually, aurally and, most important, patron comfort—eye this vast expanse of the Gaumont Palace Theatre in Paris, France. One of the largest in the world, this 5500-seat theatre provides a Raytone screen 73 feet wide by 44 deep, and was equipped by Westrex to show any existing aural-visual process, including full stereo sound.





Further evidence of technological know-how in distant lands is this view of the screen in the Regent Theatre, Sydney, Australia. Equipped to show any aural-visual process, with full stereo sound, by Westrex Corp.

LETTERS TO THE EDITOR

A Caustic Complaint from the West Coast

To the Editor of IP:

After receiving the June issue of IP, I was amazed at your lack of knowledge on stereophonic sound and wide, curved screens. First, let us analyze the situation. You say, "One down—Much More to Go," "3-D is Dead!" Why? Who killed it? Who helped kill it? 3-D will never die.

When CinemaScope came along, a lot of us projectionists were against it for technical reasons as you seem to be. We didn't believe that this process could produce a picture of adequate quality. However, I take definite issue with you on the question of stereophonic sound. That's another horse, and there you are dead wrong. Where do you get your information? Surely not from the West Coast.

You make a statement that magnetic sound is not as good as optical. This is ridiculous. You have never heard optical sound go to the range that magnetic sound does. Of course magnetic sound is sharper and crisper! It's bound to be. When presented properly it makes optical reproduction sound like the old Edison Gramaphone. If you want to talk about stereo sound, let's get the facts straight.

Then you denounce the curved screen. Why? And the metallic-surface screen! Why?

You go on to say that a manufacturer of lamps suggests using 135 amperes to obtain 15 foot-lamberts at the center of a white matte screen. This also is ridiculous. We are burning 78 amperes using water jackets with 9-mm black positive carbons and 8-mm negatives in a Peerless Magnarc. Our results, checked by the Motion Picture Research Council, showed 45 foot-lamberts on the center of a Bodde metallic screen, so you cannot sell me on your test. Who made it? By the way, our screen is 45 feet by 24½ feet, making your comparison seem even more foolish.

HAROLD T. GOLDSTEIN

Chief Projectionist, Phil Isley Theatres, Los Angeles

EDITOR'S REPLY: Thank you very much for giving us permission to publish your interesting letter. As you already know, we have been predicting the demise of 3-D for a long time, feeling that binocular pix had been accorded fatal handling in production and distribution. We also felt that most of the boys who do the experimenting took the day off when 3-D came knocking at their door.

Yes, we were all set to crow "we told you so" when your letter arrived to inform us that "3-D will never die." Apparently, this process lives on in spirit even though no significant 3-D features are in production.

Aluminum Screens

So you don't care much for CinemaScope? We've had doubts about it ourselves, but the very things that bothered us you seem to like—magnetic sound from narrow tracks and curved, aluminum screens. We have also found plenty of fault with anamorphic lenses in the past, though we are happy to report that the newer ones are quite an improvement.

You say your optical sound resembles Edison's first attempt. Well, perhaps you should come to the East Coast to hear an optical track played on top-notch, high-fidelity sound equipment which represents the criterion of expected quality back here. Hollywood can be proud of us Easterners for having exhibitors, projectionists, and sound service engineers who know their business. Frankly, we are concerned about your terrible optical sound. Are you sure that your equipment is in good running order?

Optical sound easily attains 10,000 cycles of undistorted signal with either the older 1-mil or the later 1¼-mil scanning beams, which is anywhere from 1,000 to 2,000 cycles higher than modern theatre speakers are designed to reproduce. Except in *very* unusual cases, nothing over 9,000 cycles ever reaches the ears of a motion-picture audience from the screen, no matter what type of soundtrack is played.

In regard to your special questions, we'll play the same old record over again.

We condemn curved screens because (1) they produce unequal amounts of perspective distortion for observers in the side seats, and (2) they distort the picture very badly for all patrons except those in the highest balcony seats when a moderate or large projection angle exists. It was explained by Robert A. Mitchell on page 8 of the May issue of IP why this distortion, intolerable from the ground floor, cannot be seen from the projection room (where the audience *isn't*). On the same page of IP you will also find a diagram of this curved-screen distortion.

Disapprove Aluminum Screens

We strongly disapprove of aluminum surface screens in all but long, narrow theatres because: (1) They produce an excessively *bright* picture for patrons seated in the middle of the auditorium and an excessively *dim* picture for patrons seated in the down-front side seats; (2) they reveal every tiny wrinkle in the screen by a blotchiness of the illumination; (3) they reveal seams as dark lines; (4) they exaggerate pictorial contrasts in the deeper pictorial tones while masking the fine detail in the highlights, and (5) they usually impart a grainy appearance to the picture for patrons seated close to the screen.

Some of these defects are minimized in long, narrow theatres, in which aluminum screens enable relatively low-powered arc-lamps (such as yours) to be used.

You have been so severe with us concerning the matter of arc lamps that we are forced to accuse you of neglecting your homework. If you will turn to page 11 of the June issue of IP, you will find out who made the tests on screen illumination that you object to. On that page is an advertisement of the Strong Electric Corp., an ad that contains the screen-light data you seek. You must have missed seeing it.

The Strong test is quite factual, and not in the least misleading. This test proves that the Strong Super "135" lamp burning 135 amps. gives almost twice as much light as your water-cooled lamp burning uncoated positive carbons at 78 amps. It is possible for you to get more light at

(Continued on page 30)



1 The heavy tripod is carried to top of parallel where it is set up to take the Mitchell CinemaScope camera mounted in watertight blimp.



2 Two husky grips wearing Aqua-lung equipment struggle through rocky coral beds with cumbersome tripod, lowered from nearby supply ship.



3 As when filming on land, a camera parallel is moved into position 30 ft. underwater for a new setup for "20,000 Leagues Under The Sea."



4 Cameraman Gabbani and Director Richard Fleischer (dark suit) survey scene through special CinemaScope viewfinder before camera is set up.



5 Mitchell camera in pressurized case is carried to parallel by two assistants; 175-pound camera has neutral buoyancy underwater.



6 Heavy hemp mat is placed on ocean floor to reduce amount of sand kicked up by the divers, thus increasing production time underwater.

Cameramen, Grips Work Underwater

The enormous problems faced by the Walt Disney Crew filming "20,000 Leagues Under the Sea" are described in this article abstracted from *American Cinematographer*.

By TILL GABBANI

Photos by Lt. Com. Charles Hooper, USN

THIRTY FEET underwater in the Caribbean, off Nassau, Bahamas, some eighty motion picture artists and technicians wearing safety diving gear recently completed what unquestionably was the most challenging assignment ever faced by a Hollywood motion picture troupe. Here on the ocean floor was filmed in Eastman Color with a CinemaScope lens the fabulous underwater sequences for Walt Disney's version of Jules Verne's "20,000 Leagues Under The Sea."

During this assignment there was photographed more underwater footage than for any other motion picture on record. The scenes for the most part were not the familiar underwater swimming shots of one or two people, but embraced carefully-planned and enacted scenes that required painstaking rehearsals, and the use of props and set pieces laboriously brought to the ocean floor.

Of equal interest is the fact that there were more people working underwater at one time in the filming of these scenes than in any other previous attempt at underwater film production. In the key dramatic sequence — the burial under sea of a slain shipmate of the *Nautilus* crew—there was a total of forty-two persons working simultaneously before and behind the camera.



7 Grips erect set piece which serves as background for an underwater action scene. Note one diver clad in regulation Navy diving gear.



8 Prior to starting camera, Till Gabbani takes light reading with meter, which is encased in protective plastic chamber attached to cord.



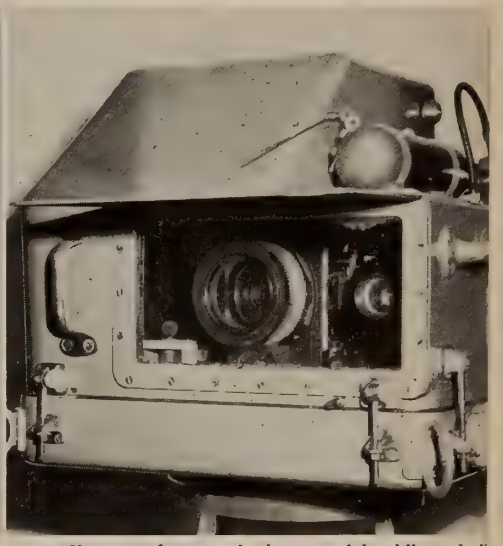
9 Director Fleischer writes last-minute instructions on underwater slate to cameraman before shooting begins on big action scene.



10 Biggest underwater scene ever photographed for a Hollywood production: the burial sequence in Disney's "20,000 Leagues Under The Sea."



11 The shooting over, cameraman Gabbani prepares to surface, carrying his exposure meter, underwater slate, and "lily" or color chart.



12 Closeup of pressurized, watertight blimp built by Disney engineers for Mitchell camera used in filming underwater scenes in color and C-Scope.

Because most of the undersea action consisted of lengthy routines rather than brief shots of men swimming, etc., our filming operations approximated those of the studio sound stage. We used a standard Mitchell camera for the stationary shots, heavy metal tripod, parallels, etc., and were assisted by the usual crew of camera assistants, prop men, and grips. About the only thing missing was the big studio lights. Here, illumination was supplied by sunlight.

For most of the crew, diving equipment consisted of the well-known Aqua-lung with air-chambers that strap to the back and permit one to remain submerged for 60 minutes; a pair of swim fins; and a diving mask. Augmenting the crew and cast directly involved in the underwater sequences were a number of expert divers.

The Carribean location site chosen for this production is perhaps the most ideal for underwater cinematography. Nowhere else is there the wide variety of picturesque coral formations, the countless different kinds of fish, ranging from the colorful grouper to barracuda, sharks and sting rays. The crystal-clear water afforded visibility to depths as great as 50 feet. Because there is no direct current running through the waters here, there was not the problem of mud or silt clouding the water to hamper photography.

The appearance of fish swimming through the water is an accepted component of underwater photography; but we found that this piscatorial prop was not always around when we were ready to start shooting. So here again, ingenuity came to the fore, and fish were gathered up by the prop men and held in wire mesh pens until time came to release them for a "walk through" in the scene.

In gathering the fish, it was learned that if the open end of the net was pointed at a coral head the fish would swim into it rather than away toward the open sea. We thus had excellent luck in always keeping the fish within the camera range. Indeed, some of them seemed to like acting in pictures. Many stuck around after a scene was over and were recaptured and used again.

Although I have had previous experience as an underwater cameraman on 20th Century Fox's "The Frogmen" and "Beneath the 12-Mile Reef," I put in more sub-surface time on this Walt Disney production than on the other two combined. This was certainly a most interesting and challenging job, but I'll be happy to settle for one on a "dull," dry sound stage.

It's Up to You -- and You Alone

A Canadian IA man takes a Spartan attitude towards his duty in maintaining projection room equipment.

By FRANK R. BARKEY
IA Local 173, Toronto, Canada

NO DOUBT the statement about to be made will bring down the wrath of the multitude upon my tender ears. However, before you get up on your own particular soap box, read the piece through and then consider all the breaks and stoppages you have had over the past five years in the light of the following:

Twenty years ago I served my apprenticeship in the projection room with a man who was guided by one cardinal rule: *No matter what happens, be it breakdown, stoppage, failure, the projectionist has no excuse. He is responsible.* As an apprentice I was taught to take that rule for granted and I still do.

Now before you throw the biggest film can in the place, let's see how correct such an attitude is. With the exception of houses where the equipment is so ancient and rickety as to present a hopeless situation, I believe that the projectionist should be able to prevent breakdowns during showtime.

Where Trouble Starts

In the modern projection room there is quite a bit of equipment that can, and does, develop aches, pains and ulcers. It all looks pretty complicated, taken as a whole, but it can be broken down into four main groups which I choose to term the heavy electrical, light electrical, mechanical, and optical groups.

The heavy electrical group includes arc lamps, generators, rectifiers, switch panels, motors and other gear drawing heavy currents.

The light-weight electrical group includes amplifiers, power supplies, photocell circuits, pre-amplifiers, exciter units and other equipment drawing relatively light current.

The mechanical group includes projector heads, drives, sound heads, film rewinds, curtain controls.

The optical group is somewhat miscellaneous and includes film, lenses, screen, lamp mirrors, and condensers. Optical sound components are not included in this group but are included in the light electrical group, being part of the overall sound system. Of course some of these items might be classed in more than one group, but for maintenance and repair purposes the classifications will serve.

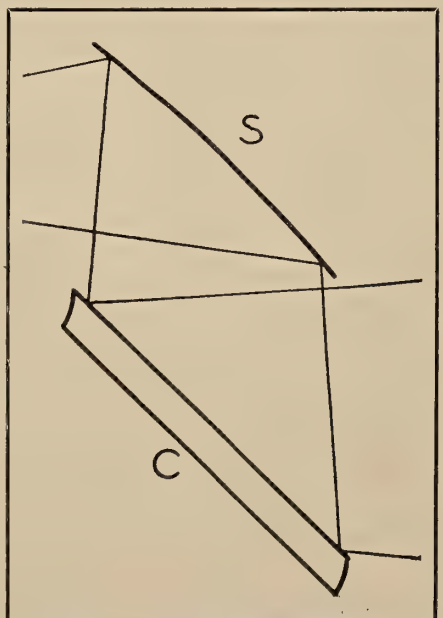
Taking the heavy electrical group first, what can go wrong? What can happen to stop your show? Well, fuses can blow; brushes can wear out; switches can fail; tungar bulbs can quit; bearings can heat and seize; electrical connections can break or loosen or oxidize; resistances can burn out; a lot of things can happen. Except for blown fuses however, every one of the foregoing troubles NEED NEVER HAVE HAPPENED. A fuse can blow through no fault of yours but do you have a replacement beside every fuse holder? If not, why not?

Worn brushes should never be allowed to reach the stage where they fail to make good contact and cause faulty operation. How long is it since you checked your generator bearings for wear? How hot does it run? A general guide to operating temperature of a motor or generator is simply to feel it. If the temperature is within safe limits you should be able to hold the palm of your hand against the casing and keep it there. It may be a bit uncomfortable in some cases but the metal should not be hot enough to force you to take your hand away. If it does, start looking. If you have

(Continued on page 29)

Dutch Use Mirrors to "Unsqueeze" Anamorphic Prints

After the introduction of prismatic as well as cylindrical types of anamorphic lens attachments, most projectionists probably felt that the limit had been reached in the development of optical systems for the "unsqueezing" of compressed anamorphic prints. That, however, is not the case. A third type of anamorphic device has been developed in Holland, according to the trade magazine, *Ideal Kinema*, of London. This anamorphic attachment works with mirrors and without cylindrical lenses or prisms.



Light beam reflected by anamorphic mirrors.

As illustrated in the accompanying sketch, the anamorphic mirrors function as follows: The upper mirror (S) condenses and reflects the projection beam from the regular projection lens onto a curved mirror (C) which expands the beam horizontally when it re-directs the beam toward the screen. The principle of the action is simple to understand because it is exactly the same as the action of the familiar "crazy mirrors" at an amusement park.

It has been claimed for the mirror anamorphic system that the mirrors can be adjusted in such a way as to counteract at least partially the distortion caused by a curved screen. Also, the mirrors are surface silvered and, therefore, are said not to create chromatic aberrations since the light beam does not pass through any other glass surface after leaving the projection lens.

Distribution — the Great Octopi?

Exhibition pays all the bills of the motion picture industry, thus its welfare is the concern of all of us, not the least of whom is Labor. Whether you agree or disagree with the appended provocative statement by an exhibitor leader (and IP agrees) it is "must" reading for all branches of the industry. IP presents:

WALTER READE, Jr.
President, Theatre Owners of America

LITTLE or nothing has occurred by way of liaison between the two great creative parts of our industry—production and exhibition. You, working in production, certainly make the lion's contribution to every motion picture. You make the initial and important investment, not only in a monetary sense, but in the writing, directing, cinematography, acting, managing—and finally, in the editing of a motion picture.

Distribution, the third branch of our industry, constituting the great octopi, has grown fat on your creative genius and on our tremendous investments and showmanship.

It is true and unfortunate that the *self-perpetuating* heads of distribution, at their whim, have the power to turn on or off the faucet of production, and that they are able to and *do* control the law of supply and demand. This is a dangerous power—and it has been used recklessly!

Inordinate Distribution "Take"

Distribution has adopted a policy of releasing fewer and fewer films at higher and higher rentals so that our position today is precarious. Exhibition is unable properly to use its talent and its showmanship to exploit and to sell the fine films which you create. Distribution exacts 30 to 35% of the *total national gross box-office receipts* derived from these same fine films.

Distribution as such, and when it acts in its capacity as *producer*, controls *when* pictures are to be released, *how* they are to be released, and *how many* are to be released. It also stipulates exploitation procedures, advertising budgets, types of bookings, and film rentals. Finally, it controls *what* you folks are to earn and *when* you are to earn it.

$4000 Weekly Salary for an Individual!

From the high percentage taken by distribution most distribution heads, bureaucratic executives, attorneys, and others, take excessive and completely disproportionate salaries—in one instance an all-time high of $4,000 a week for *an individual!* Many of these people know little about the production of motion pictures and less about the running of motion picture theatres; yet they draw larger and larger salaries and have stronger and stronger retirement plans—while you and the motion picture theatre owners of this country are less secure than ever before.

And do you know that millions of dollars are spent by distribution each year in judgments, verdicts, settlements and in the expenses incident thereto? And that there are pending more tha 200 anti-trust suits seeking damages of over $500 *millions?* And that the exhibitors of this country foot these bills each year by way of increased film rental?

This is in great measure an unwarranted expenditure of money occasioned by the archaic and short-view methods of doing business now being employed by distribution.

Film Salesmen Wraith-Like Figures

These executives might say that without distribution of a kind the industry could not exist. This, of course, is partially true. But is it really *salesmen* that we need? I have not been *sold* motion pictures in a decade. Rather, I have to plead *to buy* them.

Shipping—yes! But it is available elsewhere for a small portion of the cost allocated by distribution. Prints—no! The cost of prints is deducted *before* profits and *after* distribution costs. Advertising and publicity—no! These are also deducted before profits. Executives—yes! And they have plenty of those in plush offices!

These unsatisfactory conditions are undemocratic, economically unsound, and impractical.

The Soundless Halls of Hollywood

Walking through the long halls of major production plants in this film capital (Hollywood) we find little hum of activity. In many instances there is nothing but uninterrupted silence. Why? There has never been a greater need for more better films on the theatre screens of America. Why has it been necessary for many of you to turn to the production of low-budgeted, unimaginative Tv films? Why has it been necessary for you to raise your voice and object to the production of films in other lands?

This present system, if it were to continue, would mean less and less work for you and a continued shortage of supply for theatres—a devastating situation! This is not a matter of the customary workings of the laws of supply and demand with completed films finding their own level on their merits. It is, rather, the calculated plan of a few companies to force their desires and designs on all of us.

I have read on my own, and have been told by these few bright, old men (all of whom are economically secure and many of whom have fulfilled their contribution to this industry many years ago) that only in the

(Continued on page 28)



Out of this world . . .

New, exciting wide-screen entertainment! Thrills! Thrills! Large things made even larger! The barely visible made man-size and more! Entertainment that fills eye and mind. That's today's motion picture—a new world of advanced production, processing and projection with a world of new problems. Today many of these problems are being solved in co-operation with the Eastman Technical Service for Motion Picture Film. Branches located at strategic centers. Inquiries are invited.



Address: Motion Picture Film Department
EASTMAN KODAK COMPANY, Rochester 4, N.Y.

East Coast Division
342 Madison Avenue, New York 17, N. Y.
Midwest Division
137 North Wabash Avenue, Chicago 2, Illinois
West Coast Division
6706 Santa Monica Blvd., Hollywood 38, California



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IN THE
SPOTLIGHT



SO YOU'RE GOOD — EH?

Henry Bowyer, IA Local 173, at 80 years of age still is on the job at the Palace Theatre, Toronto, Canada.

SEVERAL changes governing rulings on projection room personnel in motion picture theatres in the state of Massachusetts, were proposed at a recent open hearing held in Boston. For the past year New England exhibitor associations have been waging a vigorous campaign against the established two-man shift in projection rooms, basing their claims for a reduction in projection room manpower on the present-day widespread use of acetate or so-called "safety" film.

The proposed changes now being considered by the commissioner of public safety, Otis M. Whitney, affect section 48, paragraphs 2 and 9 of the Department of Public Safety's rules and regulations governing equipment used in the exhibition of motion pictures. Following is a comparison between the existing rules and the proposals:

Present Law

PARAGRAPH 2 — When more than one cinemotograph or similar apparatus involving the use of a combustible film more than ten inches in length is used for the continuous exhibition of motion pictures, there shall be two licensed operators in attendance in the booth or enclosure. When only one licensed operator is in attendance it will be necessary to "black-out" during the process of changing over. While exhibiting motion pictures the operator shall devote his entire time and attention to that work, and shall not leave the operating side of the machine while it is in motion.

Proposal

In the exhibition of motion pictures no nitrate film shall be used. All film used shall be acetate film known as safety film. Every motion picture machine shall be equipped with a Dowser handle and control switch operated from either side of the machine.

While exhibiting motion pictures, the operator shall devote his entire time and attention to that work. In any theater where the equipment in the projection booth meets these requirements, and is approved by an inspector, only one operator will be required, otherwise two operators shall be in attendance during the exhibition of motion pictures.

Present Law

PARAGRAPH 9 — Not more than two thousand feet of film shall be wound on any one reel. The overloading of reels is prohibited.

Proposal

Not more than 5,000 feet of film shall be wound on any one reel. The overloading of reels is prohibited.

Walter R. Donovan, counsel for District No. 3, comprising IA Locals in New England, spoke in opposition to the proposed changes, pointing out that the two-man shift was necessary to prevent panic and stampeding in the audience should a fire break out in the projection room. False alarms, too, are a great source of danger and can create serious injury, said Donovan. Speaking against the proposed changes were the following IA men: Walter F. Diehl, Boston Local 182; Sidney Le Bow, Lowell Local 546; Jack Kano, Lynn Local 245; R. Lamphier, Brockton Local 437, and L. Normandan, New Bedford Local 334.

An official ruling on the proposed changes is expected shortly.

• "Open house" at IA conventions has become a tradition with National Carbon Company representatives, and

VANCOUVER LOCAL CELEBRATES ITS 40TH ANNIVERSARY



A record-breaking attendance marked the dinner-dance tendered recently by Local 348 at the Flame Country Club, Vancouver, B. C., in observance of the Local's 40th anniversary. IA Vice-President Orin M. Jacobson presented life membership cards to charter members W. E. McCarney, J. Lowdon, J. H. Leslie, and H. C. Roddan. 40-year membership cards were awarded to W. Tenney, R. P. Dauphinee, and J. H. Lucas. Shown above are, left to right: T. Alsbury, president Trades and Labor Council; W. Tenney, Gordon Wismer, former attorney general; J. Lowdon, O. M. Jacobson, J. H. Leslie, R. J. Gervin, secretary-treasurer, Vancouver Trades and Labor Council; W. E. McCartney, W. A. McCartney, president, Local 348, and R. P. Dauphinee.

the recent Cincinnati meet was no exception. As usual, at such affairs, the NCC headquarters was a beehive of activity the entire week of the convention. All visitors were cordially received by the NCC men who outdid themselves in making their guests welcome.

William C. Kunzmann was back at his old stand in charge of arrangements, ably assisted by a crew of NCC stalwarts, namely: V. J. Nolan, C. J. Chapman, J. R. ohnstone, E. R. Geib, Dr. W. W. Lozier, Paul Ries, J. C. Naughton, G. H. Mayer, Jr., F. C. Stovenour, C. E. Heppberger, and R. W. Spafford.

Incidentally, Bill Kunzmann celebrated his 69th birthday that week and was the recipient of many congratulatory messages — to which we add our own best wishes for many, many happy returns of the day.

• The 10th District (New York State) presented President Walsh with a check for $3000 as a contribution to the Will Rogers Memorial Hospital.

• We should like to extend our thanks to Earle Wagner, co-chairman of the convention committee, and to his assistants, for their very kind cooperation in the distribution of IP's Convention Edition to the delegates at he Music Hall. A copy of this special issue was placed on the table in front of each delegate's seat.

• John C. Pfeil, Local 561, Johnstown, Penna., was re-elected for a two-year term as a trustee of Johnstown's Central Labor Union.

• St. Louis Local 143 recently concluded negotiations for a two-year contract to March 15 last, with the owners of eight drive-in theatres. The agreement covers provision for the two-man projection room shift and provides for the continuance of the basic pay scale of $2.70 per hour, per man, for the first year of the contract, and $2.77 per hour, per man, for the second year. A feature of the contract is the employers contribution of 5% of the projectionists' basic wage to a pension or welfare fund for the members of the Local.

• An even split in the decision of the Michigan supreme court in the "vassalage" case brought against Detroit Local 199 by Louis Havens, member of Local 738, Allegan, Mich., who worked for several years as a Local 199 permit man, sustained the decision of circuit Judge Thomas Maher who ruled to dismiss the original bill of complaint. Haven filed suit against the Detroit Local back in December 1948, claiming that he was refused full membership although he paid the regular initiation fee.

• In a report to the AF of L executive council, William F. Schnitzler, AF of L secretary-treasurer, declared that the Federation membership reached the all-time high of 10,200,000 as of the end of June last.

• Morris Rotker, member of New York Local 306 and past president of the 25-30 Club of New York, has just celebrated his 40th wedding anniversary. Fruition: two boys and two girls, all married, and seven grandchildren. Morris is presently armweary from handing out diplomas in his capacity as secretary of Local School Board 19, Bronx, N. Y.

HIGHLIGHTS OF THE IA 42nd BIENNIAL CONVENTION



Earle W. Wagner, president of Cincinnati Local 327, is shown opening the IA Convention in his capacity as temporary chairman.

•



John A. Shuff, business representative of Akron, Ohio, Local 364, is greeted by his son, Robert, also of L. 364, following the election of the former as IA 8th Vice-President.

•



William F. Canavan, well-remembered ex-president of the IA, is greeted by President Richard F. Walsh on the occasion of the installation of newly-elected officers of the IA.

•



President Walsh presents the Convention gavel to William Nagengast, delegate from Local 640, Nassau County, N. Y., following the traditional "lucky-number" procedure.

IATSE 42nd Biennial Convention

AN OVERWHELMING majority of delegates to the recent IA 42nd biennial convention voted to retain IA President Richard F. Walsh and all other incumbents in office. Re-elected by an almost 2 to 1 vote, Walsh polled 708 votes against 408 for his opponent, Roy M. Brewer, who resigned as IA West Coast Representative about a year ago. The same margin marked the re-elections of Harland Holmden, General secretary-treasurer, nine vice-presidents, three trustees, and two delegates to the AF of L conventions. William F. Canavan, former International president, installed the officers.

The convention was held at the Music Hall in Cincinnati the week beginning August 9. Earle W. Wagner, president of Cincinnati Projectionists Local 327, officially opened the meeting, later turning the gavel over to President Walsh.

In his report to the convention delegates, President Walsh stated that there are now more IA members employed in the television field, including the making of Tv films, than that of any other union covering production craftsmen. He issued a warning to jurisdictional rival unions that any raids upon the IA would be retaliated in kind.



President Richard F. Walsh, IATSE

Pension — Welfare Progress

Walsh enumerated the progress of IA Locals in negotiating pension and welfare plans. He reminded the delegates that at the 1946 convention a study which might have lead to an over-all plan was rejected, but he stated that he stood ready to move in that direction if the delegates so decided.

"At the time of our last convention," declared Walsh, "only the largest IA locals in New York and Chicago had negotiated employer contributions for pension plans, while contributions covering health and life insurance had been negotiated for members of our Hollywood studio locals and for San Francisco Projectionists Local 162.

"By now two encouraging additional steps have been taken. Welfare-plan contributions for the first time have been provided in the contracts of a substantial number of small locals, and pension-plan contributions have reached a significant scale by being written into our new Hollywood Studio Basic Agreement.

Hollywood Arrangement

"The Hollywood arrangement, effective Oct. 26, 1953, calls for the employers to set aside two cents per working hour for pension purposes. While this amount is insufficient to put actual pensions into effect, it does mark a substantial beginning and commits management to a course from which it cannot very well turn back. The agreement expires on Oct. 24 of next year, and increased contributions will be sought in the new negotiations.

". . . Quite recently a five per cent health and welfare contribution was obtained by Projectionist Local 307, Philadelphia, Penna., in negotiations with the Stanley-Warner Company and several independent theatre owners. A similar agreement has been worked out by Projectionist Local 154, Seattle, Washington. And the payments into the pension fund of Projectionist Local 306, New York City, have been increased from 5% to 7%.

"Extension of welfare plans beyond the big cities occurred first in northern California, where 12 locals have obtained benefits similar to those

President Walsh on LLPE

"Labor's League for Political Education still suffers from inadequate financial support. Although in this respect we of the Alliance do better than most other unions, we still are not doing enough. Each year membership books are sent to our local unions from LLPE headquarters in Washington. The dues are only a dollar per member per year, payable through our General Office, which forwards them to Washington. Once every so often a book comes back from a local secretary, who explains, 'We cannot interest our members in this sort of thing.' Wage increases, yes. Jobs and job security, yes. All members are interested in those. Yet they cannot seem to grasp the very real part legislation plays in making jobs and raises possible. As leaders of your locals, I urge you to keep trying to establish this connection. When enough of us succeed in doing that, our investment of time and energy in Labor's League will pay off for every workingman's family in America."

ELECTED IA OFFICIALS

President
RICHARD F. WALSH

Secretary-Treasurer
HARLAND HOLMDEN

1st Vice-President
JAMES J. BRENNAN (New York)

2nd Vice-President
CARL G. COOPER (Los Angeles)

3rd Vice-President
HARRY J. ABBOTT (Philadelphia)

4th Vice-President
ORIN M. JACOBSON (Tacoma)

5th Vice-President
HUGH J. SEDGWICK (Hamilton, Ont.)

6th Vice-President
ALBERT S. JOHNSTONE (New Orleans)

7th Vice-President
WILLIAM DONNELLY (Minneapolis)

8th Vice-President
JOHN A. SHUFF (Akron, Ohio)

9th Vice-President
MISS LOUISE WRIGHT (Dallas)

Trustees
WILLIAM C. SCANLAN (Lynn, Mass.)
R. E. MORRIS (Mobile, Ala.)
GEORGE W. BRAYFIELD (Denver, Colo.)

AF of L Delegates
THOMAS V. GREEN (Newark, N. J.)
JAMES McNABB (Seattle, Wash.)

Delegate, Trades and Labor Congress (Canada)
H. W. LACKEY (Calgary, Alta.)



IA President Richard F. Walsh, being sworn in office by William F. Canavan, well-remembered ex-president of the International Alliance. Canavan presided at the installation ceremonies of the elected officers.

negotiated in San Francisco. Assistance was given by Special Representative Steve B. Newman, who encouraged the locals to unify their demands, which he then presented at a number of meetings. The settlement calls for a contribution of five cents per hour (up to a limit of $810 per week for each local). This meets the insurance company's premium and takes care of office expenses.

"More recently several locals in the states of Washington and Oregon have reached similar agreements with their employers.

"First welfare contributions reported from Canada were negotiated this spring by Projectionist Local 348, Vancouver, B. C.

"All in all, the Pension and Welfare pattern seems to be well established—so that we can now look forward to more and more plans as time goes on."

President Walsh also recommended that the controversy over foreign film production be turned over to the Special Committee for further study.

The convention defeated a resolution which would have barred members from holding office in an IA Local for five years after any period of employment in the executive branch of management.

A move to use voting machines in the election of officers at the Cincinnati convention was defeated because of the difficulty in obtaining them in time for the election. However, the delegates went on record as favoring the use of such machines in future IA elections.

Among the many prominent civic and labor personalities who addressed the gathering were James L. McDevitt, national director of Labor's League for Political Education; Carl Rich, former mayor of Cincinnati; Robert Sidell, president of Cincinnati Local 1, American Federation of Musicians, and Tom O'Brien, M. P. and general secretary of the National Association of Theatrical and Kine Employees of England.

Lester Isaac, managing director of Cinerama, expressed his gratitude to the IA men employed in the 13 Cinerama theatres throughout the country for their fine work in handling this show.

Merle Chamberlin, projection supervisor at the M-G-M Studios on the West Coast, in addressing the delegates discussed the so-called "new look" in motion pictures and took issue with the trade press for much misinformation on technical matters published in many of the exhibitor papers. He also spoke about the increasing number of damaged prints caused by faulty projection equipment, and urged the projectionists to campaign against worn-out and defective equipment. He recommended that the craft keep itself abreast of the latest developments in the industry by subscribing to such informative journals as INTERNATIONAL PROJECTIONIST.

The Cincinnati host Locals were warmly praised by the delegates for their splendid handling of the strenuous task of organization and arrangements for the convention.

President Walsh's Remarks on "Right-to-Work" Laws

"Man's return to the primitive has reached a sad extreme in 17 American states which have adopted a law allegedly guaranteeing the 'right to work'. This means the right to work without ever joining a union. Whereas the Taft-Hartley Act forbids the closed shop, these statutes go further and outlaw the union shop as well. Thus, the employers are free to fill up their payrolls with non-union people and then to cut wages to their hearts' content. The strength which employes can gain only through collective bargaining is seriously jeopardized.

"Prior to our last convention, this vicious law was on the books in Arizona, Arkansas, Florida, Georgia, Iowa, Nebraska, North Carolina, North Dakota, South Dakota, Tennessee, Texas and Virginia. Since the last convention, it has been adopted also in Alabama, Mississippi, Nevada, South Carolina and Louisiana.

"Fortunately, our good relations with most of the exhibitors in these states have kept them from using the right-to-work laws against us. But there have been some costly exceptions, and there undoubtedly will be more as time goes on."

Movie Patronage Up 5%

A steady rise in motion picture attendance throughout the country was reported this month by an industry source in New York City which asserted that film patronage is now running about 5% ahead of the same time last year. The trend is expected to continue slowly upward.

The principal reason advanced for the heavier attendance is the improvement shown in the quality of pictures released this year. It is felt that these better pictures enticed from their homes people who had lost the movie habit. It was also noted that merely average films benefited from the generally increased interest in the theatre.

Lens-Screen Chart Offered

A pocket-size chart which contains the formulas necessary for calculating any lens or screen dimension for CinemaScope or other wide-screen projection is available free from Projection Optics, 330 Lyell Ave., Rochester 6, N. Y., or through its dealers.

Wartime Uses Spurred Growth of 16-mm field

While the theatrical motion picture exhibition business has been fighting to hold its own against Tv competition during the past few years, another branch of the film industry has been growing by leaps and bounds. The record attendance at the 11th annual convention of the National Audio-Visual Association, held this month in Chicago, indicates that a large and prosperous section of the film industry is growing up around the production of 16-mm motion pictures, as well as film strips, lantern slides, and other visual aids. This is a field that projectionists should keep an eye on because it is a potential source of part-time and even full-time employment.

The recent growth of the 16-mm and allied non-theatrical film field is attributed to many factors but chiefly to the effective use the armed forces made of 16-mm films for training, documentaries, and for the entertainment of servicemen during the second World War. Military use of motion pictures opened the eyes of educators, and industrial and religious leaders to the fact that films were an extremely forceful and economical tool for communication, information and education.

Non-Theatrical Biz Soars

It is only necessary to examine the following figures on the 16-mm business to get an idea of its growth:

More than 2,300 new educational and informational films are released each year for a wide and varied audience.

An estimated 65,000 churches in the United States are equipped with 16-mm projectors to show religious films.

More than 80% of high schools in the country own one or more 16-mm sound projectors.

An educational film can be purchased and circulated by a school system at a fraction of the per-pupil cost of circulating a book. A 10% increase in school audio-visual budgets is expected for the 1954-55 school year.

A few years ago, makes and models of audio-visual equipment could be counted on the fingers. Now there are more than 400 models of audio-visual equipment in current sale and manufacture. A recent directory lists 43 models of 16-mm sound projectors, 77 tape recorders, 48 opaque and overhead projectors, 44 filmstrip projectors and a host of other items.

Only a short time ago non-theatrical films of any merit were scarce, and new production for educational and religious use amounted to only a few dozen subjects a year. Now, in contrast, one filmstrip producer turns out a new title every three working days throughout the year.

C. J. Chapman Heads Industrial Products for National Carbon Co.

C. J. Chapman has been named as General Sales Manager of Industrial Products for National Carbon Co. Headquartering in the general offices in N. Y. City, Chapman will direct sales activities on the company's Carbon and graphite electrode, projector carbons, carbon brushes, signal cells, and chemical and metallurgical carbon products.

Chapman received his B.S. civil engineering in 1933 from Dartmouth College. He joined National Carbon Co. in 1936



C. J. Chapman, General Sales Manager, National Carbon Co., Industrial Products

as a salesman in the Eastern District, being transferred in 1937 to the Pittsburgh District as a salesman. In 1944 he was made Assistant Manager, Atlanta Division, and in 1945 Assistant Manager, New York Division. He returned to Atlanta as Manager of that Division in 1948; and was made Chicago District Sales Manager in 1951, the position that he has held until his present appointment.

Drive-in Bills Live Wrestlers

An enterprising Cleveland drive-in operator doesn't believe in giving the Tv people any respite. In addition to a double bill, he presents a favorite type of Tv program as a live act every Thursday evening. Three wrestling matches take place on a platform in front of the screen. An estimated 5,000 patrons attended one recent Thursday program.



FOR AULD LANG SYNE: This photograph, taken in London, Ont., Canada in 1919, pictures many old-time IA stalwarts—not one of whom is alive today. To the first 5 readers who identify the occasion and at least 10 of the personnel, IP will award a free 1-year subscription.

PERSONAL NOTES

EUGENE S. GREGG has been elected president of the Westrex Corp., succeeding Frederick W. Bierwirth who retires this month under the company's age retirement rule. Mr. Gregg, since 1941, has been vice president and general manager of the corporation, a



Eugene S. Gregg, newly elected president of Westrex Corp.

Western Electric subsidiary which handles the distribution and servicing of motion picture sound equipment throughout the world except for the United States and Canada.

Mr. Gregg was born in Byran, Texas and was graduated from Austin College in 1913. During World War I, he was a captain in the shipping section of the general staff of the Army. In 1926 he joined Westrex as a statistician and a year later was made chief statistician. In 1931 he became general manager for the eastern division of Electrical Research Products, Inc., a former subsidiary of Westrex.

WILLIAM E. CHEESMAN has been appointed field sales representative for RCA theatre products in the Eastern and Northeastern regions, it was announced this month by J. F. O'Brien, theatre equipment sales manager. Mr. Cheesman succeeds Bernard Sholtz, one of the industry's pioneer field sales representatives, who has retired after serving RCA in the same territory for more than a quarter of a century.

Product manager for RCA theatre carpet and chairs for the last three years, Mr. Cheesman now assumes responsibility for sales of RCA theatre sound systems, projectors, speakers and screens in the Eastern-Northeastern region. This area includes such major theatre centers as New York, Philadelphia, Washington, Boston, Pittsburgh, and Buffalo. Prior to 1951, he was for six years supervisor of order service for RCA theatre equipment. He has been with RCA since 1930.

Well known to projectionists throughout the Eastern seaboard, Mr. Sholtz joined RCA in March, 1929, as field salesman for RCA photophone equipment.



More and more Drive-Ins are demanding these fine lenses. The Super Snaplites are guaranteed to give you Sharper Pictures, More Light on the Screen, Greater Contrast, and Greater Definition...and this under the most trying outdoor operating conditions. Actually 7 out of 10 new Drive-Ins install Super Snaplite Lenses...and more and more established Drive-Ins are turning to Super Snaplites. Ask for Bulletin No. 212, it gives you complete information on these lenses.

KOLLMORGEN Optical CORPORATION

Plant:
347 King St.,
Northampton, Massachusetts

New York Office: 30 Church Street, New York 7, N. Y.

Projection Optics Making Variable Anamorphic Lens

A new variable anamorphic lens, claimed to embody a number of improvements over prismatic "squeeze" lenses previously marketed, is now in production at the Projection Optics Co., Inc., Rochester, N. Y. This lens is designed to fit a 4-inch diameter projection objective lens in addition to the smaller size. The price is $750 per pair.

At a demonstration in New York this month, Fred Aufhauser, president of Projection Optics, stressed the following two features of the lens, which is known as the Hilux VAL (variable anamorphic lens):

First, the two variable prisms, which perform the work in this type of lens, are controlled by separate knobs, permitting the projectionist to adjust the prisms in such a way that the screen is completely filled even when switching from CinemaScope to the slightly offside CinemaScope aperture.

Correcting Lens Added

Secondly, in addition to the two prisms, the Hilux VAL has an additional correcting element mounted in front of the lens to perform a double function. It sharpens the image and also seals the front of the lens so that dirt will not lodge on the surfaces of the prisms. This correcting lens is supplied in six different strengths to accommodate various projection throws. The rear of the lens is not sealed but it is screwed to the front of the regular projection objective when in use, and a threaded metal cap is provided to seal the rear when the lens is stored away.



Hilux prismatic anamorphic lens

The Hilux "Squeeze" lens is set in a cylindrical cast aluminum barrel, which is said by the company to be the most efficient shape for transmitting the maximum amount of light and for exact optical adjustment with the projection objective. Other prismatic anamorphics usually have a square casing. This lens has a top magnifying power of 2 to 1, enabling it to deliver an aspect ratio anywhere from 1.33 to 1 up to 2.66 to 1 when a print "squeezed" to the desired size is available.

A strong demand is expected for the Hilux prismatic lens because it can handle both CinemaScope prints and the new VistaVision "squeeze" prints.

General Precision Profits Up

Consolidated net profit of General Precision Equipment Corp., parent company of National Theatre Supply, International Projector Corp. and other theatre equipment manufacturers, was $2,541,652 for the six months ended June 30. This compares with a profit of $1,469,066 for the same period last year.

Net sales for the same six month's period ending June 30 were $54,305,196 compared with $41,102,567 for the year before.

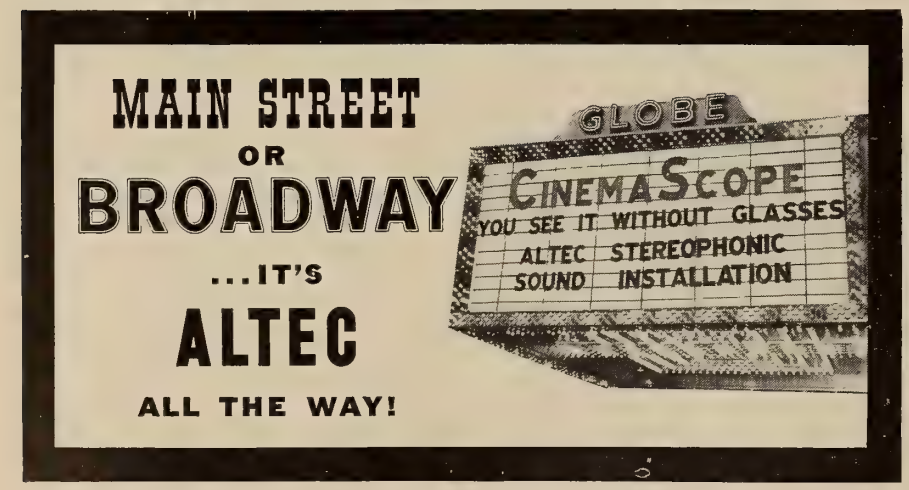
WILLIAM P. RAOUL

William P. Raoul, former General secretary-treasurer of the IA, died last month at the Georgia Baptist Hospital, Atlanta, Ga., following surgery.

A native of Atlanta, William Raoul became a pioneer projectionist while still a student at Georgia Tech, and in 1909 he was appointed to the city's first board of examiners of motion picture projectionists. He joined Atlanta Stagehands Local 41 in 1910. In 1911 he helped establish Projectionists Local 225, serving as its first secretary and then as its president for many years.

In 1918 Raoul was appointed an IA representative, spending most of his time in building up the organization throughout the South. He was appointed assistant IA president when Richard F. Walsh took over the presidency in 1941, and in 1945 he was elected General secretary-treasurer, a post he held until ill halth forced his retirement in August 1953.

He served as president of the Atlanta Federation of Trades, and as president of the Georgia Federation of Labor. He was a charter member of the Atlanta Variety Club and a 32nd degree Scottish Rite Mason and a Shriner.



Altec's current installation rate accounts for 75% of total stereophonic sound sales!

Broadway or Main Street, theatre owners know Altec's engineering skill and know-how assure perfect installation, sure service.

That's why Brandt's GLOBE, Broadway, New York, (pop. 8,000,000) and the OPERA HOUSE, Lebanon, New Hampshire, (pop. 4,614) signed Altec stereophonic installation and service contracts!



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864 Theatres in N. Y. Area

Theatres situated in the New York City metropolitan territory total 864, including 821 conventional houses and 43 drive-ins, according to a recent count. The metropolitan territory includes New York City, Long Island, New York State south of Kingston, and New Jersey north of Trenton.

New York City's five boroughs have 436 theatres and two drive-ins. Location of the theatres can be broken down as follows: Manhattan, 160; Brooklyn, 146; Bronx, 68; Queens, 79, and Staten Island, 10.

Theatres in Long Island, outside of Queens total 72, plus eight drive-ins, while there are 93 theatres and 14 drive-ins in the southern part of New York State. Northern New Jersey has 220 theatres and 19 drive-ins.

Color Tv Link to 94 Cities

By the end of the year there will be 40,000 channel miles of transmission facilities equipped to bring color Tv service to 94 cities, American Telephone & Telegraph Co. announced this month. The company is now able to serve 47 cities with color.

Among new cities to be placed on color circuit in the next five months are Buffalo, Des Moines, Indianapolis, Jacksonville, Knoxville, Little Rock, Miami, Norfolk, Richmond, Seattle, Portland, Ore., Portland, Me., Wheeling, Galveston and Phoenix.

C'Scope Slow in Australia

CinemaScope installations are moving slowly in Australia, with only four independent theatres having already installed the medium, with six more slated for near future. Hoyt's Circuit has gone all out, but it must be remembered that this circuit is controlled by 20th-Fox in America. Many Hoyt houses will not have stereophonic sound, at least now.

M-G-M's 12 Aussie houses have converted for C'Scope, but will use the Perspecta sound system. Aussie exhibitors are a bit wary of too rapid a conversion job not only because of the cost factor but because they are attracted by the possibilities of Par's VistaVision process.

Super-Fast Film from Kodak

A new type of negative film that will considerably increase the versatility of the motion picture camera has been marketed by the Eastman Kodak Co. Known as Eastman Tri-X Panchromatic Negative Film, it has twice the speed (sensitivity to light) as the standard Super XX film but just about the same or slightly less graininess.

Ordinarily, the faster the film the more grainy it is, making extra fast film of limited value. The new Tri-X film, however, will permit sharp photography under very difficult lighting conditions. A Tri-X booklet is available from Eastman Kodak.

IA OBITUARIES

Cornelius A. Hitzert, 71, member of Stagehands Local 6, St. Louis, Mo., was overcome by the heat and died last month when the temperature reached an all-time high of 115 degrees. Hitzert joined the Local back in 1910 and worked in many of the St. Louis theatres, until he was placed on the disability list in July 1952.

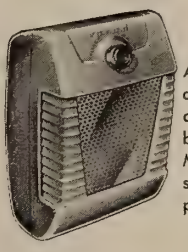
Philip Schare, member of Detroit Local 199 and projectionist for many years at the Film Exchange, died after a long illness. He is survived by his wife, two children, and three brothers.

Waldon C. McDonald, 50, member of St. Louis Local 143, was killed in an automobile accident. He was well known in the entertainment world having worked as a master of ceremonies in various night clubs. He became a member of Local 143 in 1944 and was popular with the membership.

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EPRAD STAR

An economical speaker which outclasses all competitive models. It has a 3½-inch cone . . . and a Fiberglas case with beautiful molded-in colors. Many of EPRAD "Universal's" superb qualities are incorporated in this speaker.

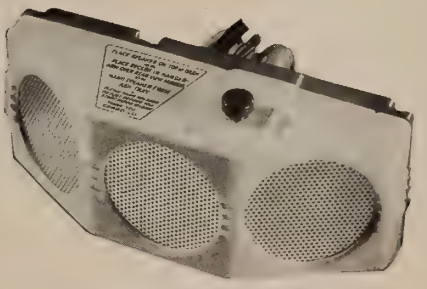
$5.50 Per Speaker



EPRAD UNIVERSAL

The world's most popular replacement speaker. We, along with many operators, feel that it's the best-sounding, most trouble-free, easiest-to-service speaker on the market. It has a Die-Cast Aluminum case and a 4-inch cone. Put a sample speaker in your drive-in and you'll insist on **complete replacement** with EPRAD Universals.

$7.60 Per Speaker



EPRAD 3-WAY

An owner who recently had this unit installed, claims it gave the finest sound ever heard . . . including standard, optical or stereophonic. He plans to install them in all of his drive-ins. This single Fiberglas case, stereophonic-sound speaker is only slightly larger and heavier than conventional speakers. Sound quality is truly realistic beyond belief because of three, 3½-inch driver units with 1.47 ounce magnets.

$14.75 Per Speaker



EPRAD 2-WAY

Want to give your patrons economical Stereophonic sound effects? Then here's the speaker for you. This Fiberglas cased, 2-way speaker is approximately the size and weight of a standard speaker. It mounts on either the rear-view mirror, top of the dash, ash tray, or window.

$11.50 Per Speaker

Call Your Favorite Independent Dealer

FOR COMPLETE DETAILS, WRITE

EPRAD

The "VOICE OF THE DRIVE-IN"

1206 CHERRY ST. TOLEDO 4, OHIO

DISTRIBUTION — THE GREAT OCTOPI?

(Continued from page 17)

so-called epic or million-dollar-budget pictures is there a future in production and a basis for substantial profit. I say to you now that this is not so. Medium- or low-budgeted pictures, well planned, well exploited have been and will continue to be successful.

Creative Ability the Only Payoff

You may say to me that it is all very well for me to talk this way, but how can we, as individual groups, or as individuals, produce motion pictures and get the finished product delivered to your theatres? It has been done, it is being done, and more of it must be done. Here in this very room is creative talent, the creative genius of our industry. You may need financial support. Bankers and theatre owners are ready, willing and able to back you for the appropriate talent, the proper story and the fresh approach.

Pay no attention to the malicious and untruthful statements by distribution that exhibition plays an unimportant role in the motion picture world. Do you know that exhibitors in the United States have an investment of billions of dollars in their plants as against a far, far smaller investment by all of the production and distribution elements combined? Your contribution, your investment, and your rewards are at stake, too. Should we not work together on a cooperative basis to the end that we may build more securiy and a more prosperous industry?

"Phony" Overhead Means Prohibitive Costs

The phony overhead and the prohibitive costs of distribution must be reduced and changed. Existing methods are chaotic and will not do. You have given us new ideas, new thoughts. We, in turn, are daily developing new and better ways of theatre management and of showmanship. It is essential that from this time on there be a positive, strong, well planned, co-operative effort between you and the theatre owners.

If there be some doubt in your minds as to the need as I have stated it concerning our real desire to cooperate, you have but to leave the enchantment of your Hollywood backyard and visit, with me, as I have these many months, the small and the large cities of America, speak with the theatre owner and with the man on the street concerning the place and the prominence that Hollywood-made movies have in the American way of life.

I remind you that the only *direct* tie you have with the box-office line of America is the theatre manager who is at that line 7 days a week, 52 weeks a year. He tells you that the goal of production and distribution must be a steady flow of good product adequate for proper operation of the country's theatres.

★ ★ ★



IT'S UP TO YOU . . .

(Continued from page 16)

tungar bulb rectifiers, how long is it since you cleaned the contacts? Do the filaments have neat, even coils or do they resemble badly mauled pretzels? How many flies do you suppose you could find if you took the covers off your lamp switches? Your equipment should get a regular, thorough check for warn parts, bad connections, dirt. Voltage readings should be taken regularly and if possible a current reading.

Aid from Serviceman

What we choose to call the light electrical equipment in most cases is serviced by sound engineers. If they do their inspections properly you will have little to worry about. So don't. But do you have a complete set of spare tubes? Do you know the tube lineup in your particular amplifier?

If a filter condenser lets go in the amplifier power supply, do you recognize the resultant effect on your sound? Can you make emergency repairs? Do you know how to use a multimeter? Do you have a pair of earphones in the projection room? Do you know how to make a point test for sound right through the amplifier with these earphones? If not, why not?

The sound engineers may be responsible for keeping your equipment in operating condition but they don't seem to be too helpful when they are 100 miles away. If something goes wrong in the middle of a show you are the Joe who has to get a picture back on the screen—with sound. The golden rule is to learn your own equipment, learn the theory of that equipment, and most important of all, get actual practice in trouble shooting that equipment if at all possible.

Mechanical maintenance should require no comment. Presumably every craftsman makes periodical inspections of his projectors. Proper lubrication and cleanliness are two important points to watch as we all know. But do you know I have seen cases where sprocket shafts have seized solid from lack of oil?

On one memorable occasion I opened a projector for oiling and couldn't find the oil vents for encrusted dirt. A thick layer of grease and dirt had to be scraped off before the machine could be oiled. Except for the gear teeth, every gear and shaft was caked with the stuff. And these machines were in daily use. You can imagine the rest of the equipment.

Projectors Wear Slowly

Drive belts, take up belts, pressure pads and so on will need replacement. Sprocket teeth wear, tension springs gradually weaken, rollers get grooved, screws and bolts loosen up and fall out, a hundred things get out of whack. The insidious part of it all is that these things happen so gradually you don't notice them until you suddenly have to shut down.

Of course, the catcalls and whistles of the morons in an otherwise polite audience helps a lot just at this time. But was the shutdown necessary? No. Are you responsible for the shutdown? Probably. If you had been making regular inspection and adjustments you would have foreseen trouble and prevention might have been applied before it happened.

What I choose to call the optical

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For all the details of the many fine features of the new HT 135 TransVerter write for Bulletin No. 301B.

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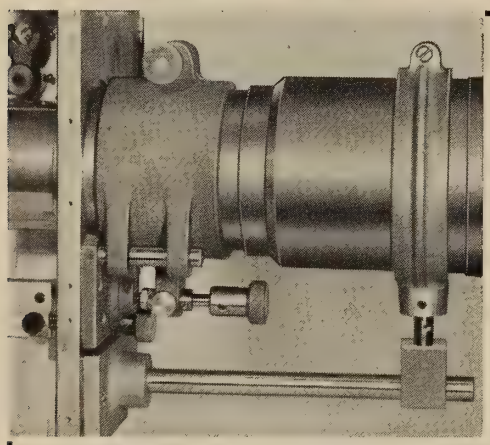
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group includes probably the worst offender from the standpoint of shutdowns, that is film. By far the majority of shutdowns are caused through film breaks. Film breaks should never happen. This is one aspect of the projectionist's job where he cannot have the faintest excuse for a dark screen. The film may come from the exchange ready to fall apart at a sneeze but that is still no excuse. It is the projectionist's job to check it and make sure it is in running shape before it is ever placed around a sprocket.

If this involves an unreasonable amount of time and work, throw the film back at the exchange and demand better prints. Scream to high heaven about your bad prints and pretty soon they will make sure you get them in pretty fair condition. This writer on a number of occasions has refused to run prints considered to be in dangerous condition. The exchange had good prints in the theatre before show time. After this happens a few times it is surprising how few poor prints you receive. Believe it or not, on several prints with unavoidable defects, the exchange has written to let me know about it several days in advance. You don't have to be close to the exchange to establish this policy. Our film is shipped 120 miles to us.

The answer to the whole problem is preventative maintenance—not repair. Get the trouble before it starts. Equipment, regularly and systematically inspected will give good service and few breakdowns.



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LETTERS TO THE EDITOR

(Continued from page 13)

78 amps., but you will have to stop cooling off your carbons!

Details of Strong Test

The Strong Super "135" projects to the screen 16,000 lumens *with the shutter running* and anamorphic lens on. Since the 50 x 19½ foot screen used in the test has an area of 975 square feet, the mean intensity of illumination at the screen has a value of 16.4 foot-candles. As side-to-center light-distribution is ordinarily a matter of 65%, illumination at the center of the screen is 19.9 foot-candles. Now, most matte white screens have an average reflectance of about 76% when perforated. The brightness of the center of this screen, illuminated by the Strong lamp *with projector shutter running*, is accordingly 15.2 footlamberts. That's just what we claimed.

Your lamp setup gives very nearly 8,500 lumens at 78 amps *when the shutter is running* and when the anamorphic lens is used. Rest assured that this is a generous estimate. 8,500 lumens is just about the best you can expect to do with water-cooled, non-coated carbons in a simplified H. I. lamp at 78 amps. You are burning current merely to heat water!! You *could* be getting 10,000 lumens *without* those water-jackets!

Screen Light Inadequate

Your 45 x 24½ foot screen has an area of 1,102½ square feet. With 8,500 lumens covering this surface, the mean intensity of illumination is 7.7 foot-candles. With side-to-center distribution of 65%, illumination at the center of your screen is 9.3 foot-candles—damned little, if you ask us. Since an aluminum screen has a reflective value of about 240% opposite the incident optical angle, the brightness at the center is 22.3 foot-lamberts.

At this point you will undoubtedly protest that your center brightness was found to be 45 foot-lamberts by actual

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measurement. Just be patient with us. The rotating projector shutter cuts the light approximately in half; and if you divide 45 by 2, the result is 22.5 foot-lamberts. That's pretty close to our estimate of 22.3 foot-lamberts, don't you think?

Your value of 45 foot-lamberts was measured without the shutter running!

How Light Is Measured

All screen light measurements are made that way because the light-meters used don't work accurately with flickering light. But the Strong people divide their *direct* measurement by 2.

Now suppose that Strong and you swapped lamps. Your lamp (with its water jacket and uncoated carbons) would give only 8.0 foot-lamberts at the center of Strong's white screen. The Strong Super "135" lamp would give 42.2 foot-lamberts at the center of your aluminum screen when the shutter is running, or 84.4 foot-lamberts when the shutter isn't running. Satisfied that we had our facts straight?

No? Well then consider this. At a 45° viewing angle, the reflectivity of an aluminum screen drops to about 36%, resulting in a screen-center brightness *in your theatre* of only 3.3 foot-lamberts. Such an extreme angle has little practical significance in long, narrow theatres; but even at a 35° angle (aluminum-screen reflectivity 60%) center-brightness has a value in your theatre of 5.6 foot-lamberts, considerably below East Coast SMPTE standards. Don't be dazzled by the flood of light that your type of screen throws straight forward like a mirror!

For All Viewing Angles

With a white screen, however, the brightness remains the same from *all* viewing angles; and this is why matte screens are mandatory in wide theatres. To use a white screen in your theatre, having the same size as your present screen, you would certainly need more powerful lamps than your present ones. To mention but two out of several makes, the Strong Super "135" burning 135 amps, and the Peerless Hy-Candescent burning 185 amps, both give 16,000 lumens *with the shutter running.*

That's the way the situation looks from here on the East Coast.

Appreciation

To the editor of IP:

I have renewed my subscription to the *International Projectionist* for a further period of two years. Thank you very much for a magazine that concentrates on giving all the information on the new types of screen presentation and not on the art of selling ice cream. Please note change of address.

L. Goulter

22 South Bank, Long Ditton
Surrey, England.

Westinghouse Sales Film

Varied motion picture techniques are being utilized by Westinghouse Corp. in a cross-country tour of a new sales show designed to explain the advantages of modernizing electrical equipment. A 21-foot translucent screen, backed by two motion picture projectors, three slide projectors and two speakers is being used. Showings will be in color, with motion picture scenes blending into slides, and *vice versa,* as the change in technique suits the sales story.

Units of the IA are being urged to contact local Westinghouse outlets for the dates of showings.

"G W T W" Still Breaking Records

Reissued and playing Loew's State Theatre, N. Y. City, "Gone With the Wind" in its first eight days outgrossed every M-G-M picture that has played there. Similar terrific grosses are being chalked up country-wide, with M-G-M expecting to net $10,000,000 for this trip around the country.

Foreign Production Woes Cited

Foreign production location jaunts pay off only when American crews go along, according to various directors recently returned from overseas picture-making assignments. Major blame for the cancellation of some recent American efforts in foreign climes *after production was underway* is attributed to faulty budget and schedule estimates which did not take into account the fact



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that foreign crews are not trained in American methods and that the language barrier makes for interminable delays.

These views echo precisely the opinions advanced by the organized studio crafts for many years past, who held that the lure of "cheap" production abroad was a mental mirage, quite apart from the fact that such junkets deprived U. S. studio workers of much-needed employment.

TESMA Forum Planned

For the second year in succession, the new processes forum will be one of the biggest events at the TESMA-TOA convention which will run from October 31 through November 4 at the Conrad Hilton Hotel in Chicago.

Again this year, the forum will provide a panel of experts well versed on every phase of theatre equipment, accessories and new processes. Last year this event attracted more than 1,000 exhibitors and theatre equipment manufacturers, projectionists and dealers from all parts of the country.

With interest running high among projectionists and theatre owners concerning the selection of the proper lens to solve the problems of their particular theatre and the projection process being used there, the display of lenses will be the largest ever seen. In addition, every projector manufacturer in the United States will show his products along with a host of other equipment producers.

New Ampex Loudspeakers

Two new loudspeaker systems, especially designed to reproduce the wider frequency range possible with magnetic sound, are now available from Ampex Corp., Redwood City, Calif. Future Ampex installations in theatres having a seating capacity of 1000 to 1500 will be equipped with the new Model 5050. This unit consists of two low-frequency speakers and their baffle, a high-frequency driver and horn, and a crossover network. The complete system is, in inches, 84 high, 72 wide and 36 deep.

For larger theatres with a seating capacity between 1500 and 2000, Ampex has designed the Model 5070. This speaker, installed with Ampex 60-watt stereophonic systems, includes two low-frequency speakers in a larger baffle, a high-frequency driver and horn, and a crossover network. Installed, the dimensions, in inches, are 79 high, 84 wide, and 48 deep.

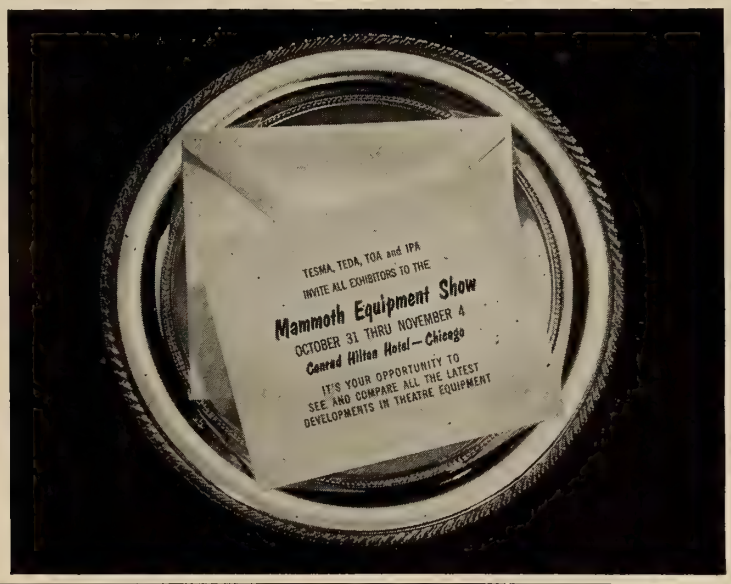
RCA Antenaplex on West Coast

Three new offices on the West Coast to handle the Antenaplex Tv systems business have been opened by RCA Service Co. In the Pacific Northwest is an office at 718 Dearborn St., Seattle, in charge of Edward Long, who was formerly Antenaplex rep for Southern California. In Hollywood at 911 Orange Drive, these operations will be directed by Warren Burr, former supervisor in the Hollywood service branch; while in Northern California the rep will be Edward Norton at 2640 Bayshore Blvd.

The offices are staffed by technical experts with distribution systems experience. Antenaplex systems are finding increasing usefulness in multiple dwellings and motels, and in providing multiple outlets to serve entire communities with television service.

CORRECTION

Rosco Laboratories, manufacturer of a number of chemical products for the projection room, is located at 367 Hudson Avenue, Brooklyn 1, N. Y. rather than 367 Hudson Street, as was stated in error in an advertisement that appeared last month in IP's Convention Supplement.



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AN EVALUATION OF OPTICAL SOUND

(Continued from page 8)

film produce less noticeable noises.

In Europe, however, very narrow slit-images are preferred. Most European soundhead manufacturers use images approximately 8 mils (20 microns) in width, and the German firm of Zeiss Ikon employs a 7-mil (18-micron) slit-image in Ernemann equipment. This writer sees no need for such narrow images. The American 1¼-mil slit-image, adopted as a standard by the Academy of Motion Picture Arts and Sciences, has everything to recommend it.

In every case the *length* of the slit-image is 0.084 inch (2.13 millimeters), slightly less than the width of the printed area of the track (0.1 in., or 2.54 mm.). The width of the sound record in a *completely modulated* variable-area track is the same as the length of the scanning beam. Only the loudest sounds have a modulation as great as this.

Focusing a Delicate Job

Every projectionist knows that the quality of the sound is poor when the optical tube is out of focus. The focusing procedure, though simple, is a delicate job. It can't be hurried. By running a 9,000-cycle test loop and plugging an output meter into the soundhead or preamplifier, the sound service engineer lines up the rotational, or azimuthal, adjustment of the tube. (The thin line of light must cut the track perpendicularly to the direction of film-travel.) Then he restores the focus by moving the tube nearer or farther away from the film-plane. In each case the needle of the output meter shows when the output is at maximum strength.

The projectionist can use the "flicker test" for focusing the optical unit, but he must guard against disturbing the rotational adjustment. If the scanning beam cuts the track at a slant, distortion will be produced.

Procedure for Test

Thread a short length of film having a high-frequency record (many very fine lines) into the soundhead. With the exciter turned on, and with a white card placed in front of the photocell so that the exciting light forms a spot on it, "inch" the film down *very slowly* by means of the projector handwheel. The soundtrack frequency lines will throw shadows on the card.

If the shadows move *upward*, the optical tube should be *farther* from the film; if the shadows move *downward* (in the same direction that the film moves), the tube should be *closer* to the film. When the unit is in perfect focus, the spot of light on the card will flicker uniformly as the film moves down through the beam.

Lateral adjustment of the sound-

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track is accomplished by means of a flanged guide-roller on the older soundheads, and by the pressure-roller on most rotary-stabilizer heads. Once made, this adjustment is good for years. It needs to be changed only when frame-line noise and sprocket-hole "motor-boating" appear in the sound.

In order to simplify soundhead optical adjustments, a few foreign manufacturers illuminate the soundtrack with a wide beam of bright light and project an enlarged image of the

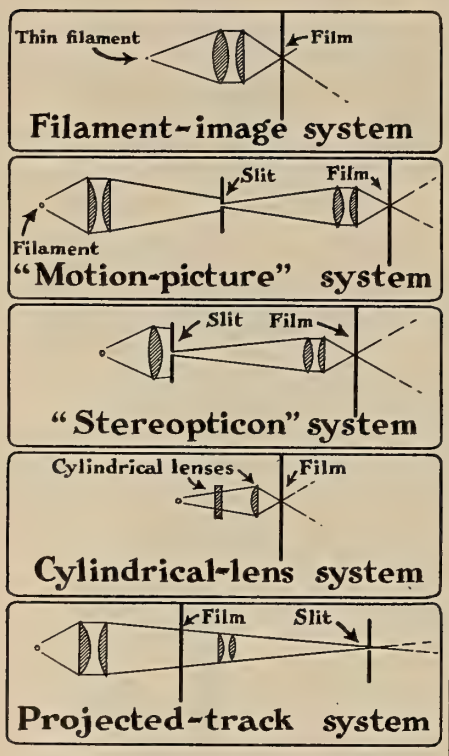


FIG. 2. Five methods of optical scanning.

track on a mechanical slit large enough to be adjusted visually by the projectionist. The light emerging from this slit is directed to the photocell by means of a condensing lens.

Another simplification of soundhead optics is found in the cylindrical-lens system which forms an elongated image of the exciter filament on the soundtrack. The cylindrical lenses produce a line of light having a width only 1/10th that of the lamp filament, and hence no mechanical slit is used. This is a popular system for 16-mm and other portable projectors because of its high luminous efficiency and "fixed-focus" characteristics.

All of these optical systems are shown diagrammatically in Fig. 2.

Photocell Signal Is Weak

No matter what kind of scanning system is used, the photosensitive cathode-plate of the photoelectric cell is the screen upon which the modulated scanning beam is projected. The cell converts the flickering light into fluctuating electric currents which waver in conformity with the photographic variations of the soundtrack. The currents emitted by the photocell are very weak, and must be amplified as much as 10,000,000,000 times to gain sufficient power to actuate the loudspeakers.

Even though the action of the phototube still seems like a modern electronic miracle, many of the basic principles of photoelectricity were discovered as long ago as 1845, the year that Alexandre Becquerel, a French physicist, discovered that glass-enclosed voltaic cells ("wet batteries") gave higher voltage when strongly illuminated.

This early discovery led directly to the Wein and Arcturus batteries which were introduced commercially in 1929, almost a decade after regular photoemissive cells had been devised. These miniature voltaic cells were arranged so that light impinging on one plate generated considerable current.

[TO BE CONTINUED]

MONTHLY CHAT

(Continued from page 5)

room, but instead are caused by inherent flaws in the process, it would seem that 20th-Fox is trying to pass the buck to the projectionist for production faults. As the process grows older, these faults are being slowly corrected. Witness the delivery to Hollywood of greatly-improved 'Scope taking lenses from Bausch & Lomb.

However, one thing is clear. After spending millions of dollars and much effort in persuading exhibitors to install CinemaScope, Fox now realizes that the projectionist is also important. Without his effort, patience, and technical savy, CinemaScope might often drive people out of the theatre rather than bring them in; then this process would never reach a state of full development.

It is interesting to speculate on what the role of the projectionist may be during years to come. The complexity of his work has increased tremendously during the last 25 years, and is likely to become even more complicated. Although jobs—in the theatre at least—may be fewer in the future, there is consolation in the fact that the dignity and responsibility of the projectionist's position continues to increase. J.M.

NBC Film Division Upsurge

Film division of National Broadcasting Co. is now supplying Tv stations with a total of 736 *weekly* half hours of local programming via film prints, as compared with 235 at the same time last year.

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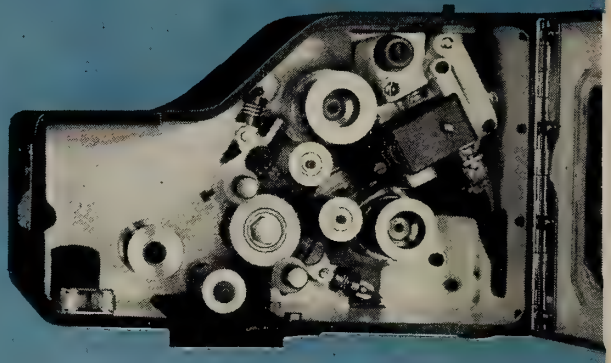
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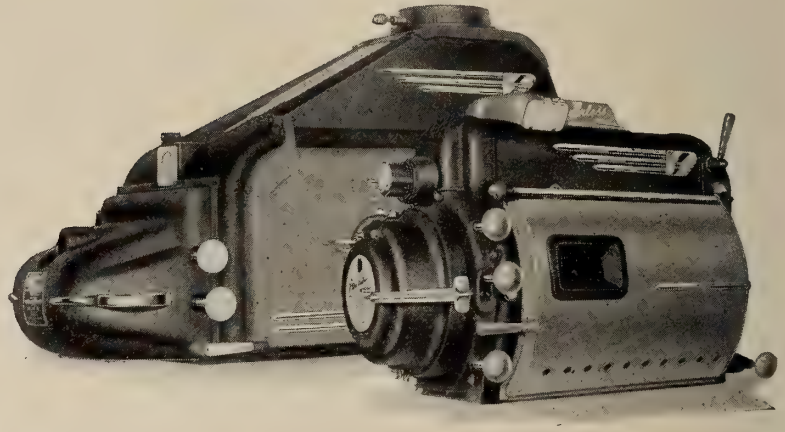
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MONTHLY CHAT

ELSEWHERE in this issue there appear excerpts from the address given at the recent IA convention in Cincinnati by Merle Chamberlin, director of projection for the M-G-M studios in Culver City, Calif. This address was of two-fold significance:

1. It marked for probably the first time the appearance at a public forum of a top-flight production executive who openly proclaimed the industry's utter dependence upon the technological processes, and (2), it served as an adrenalin-shot to the morale of the projectionist craft which for years has endured the stigma of a "dispensable" and "tolerated" adjunct of the industry.

No more is this business of ours a mere welter of buying and selling a product which depended for its very lifeblood upon the technological processes — although the "brass" knew it not. This has been demonstrated in fulsome measure over the years by such industrial titans as, for example, Eastman Kodak, General Motors, and DuPont.

We once heard David Sarnoff, who traveled the torturous course of technology to his present eminence as head man of RCA, say that the word "research" was invariably mispronounced; he insisted that the accent should be placed upon the second syllable.

Change in Mental Atmosphere

This constant seeking for that which is not only new and novel but that which is *better*, determines the lifespan for industry no less than for humans. This point of view which has for these many years earned for IP the appelation of "carping critic", is now granted industry-wide acceptance. For its part, IP welcomes this change in the mental atmosphere; but it induces no blushing on our part to say that we alone of the entire industry press kept our sights on distant horizons.

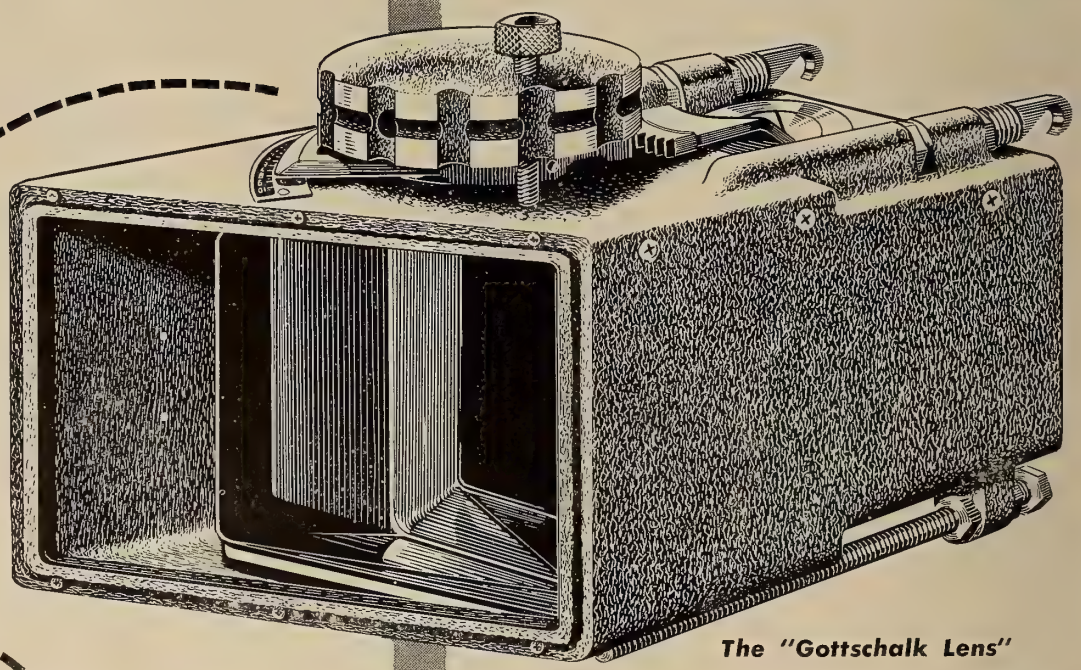
To Cinerama, to CinemaScope, to VistaVision, and to all those hardy souls who supplemented their brains, their hands, and their hearts with the mighty resolve to go forward, IP makes obeisance.

It is our purpose—and the only reason for our existence—to pursue these distant goals so that we and every other segment of this industry shall go forward.

The foregoing is by no means the product of random thinking but rather a coldly-calculated approach to a problem fraught with the utmost significance to the industry at large. At the risk of being charged with mouthing the same old refrain, IP still holds to the view that endless benefits would stem from a single afternoon session in some secluded nook attended by, say, five persons from the technical end of this business. The object: standardization.

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Vol. 29 No. 9

Sept. 1954

We Invite Your Attention to . . .

the pages immediately following: three articles by internationally-recognized authorities on the art of visual and sound reproduction. Whatever their divergencies in points of view, these data provide, at the very least, a sound basis for serious discussion.

Screen Light With Various Projection Aspect Ratios

By CHARLES A. HAHN
J. E. McAuley Mfg. Co.

THE APPENDED data compares the aperture opening areas of the various aspect ratio apertures (Table A). The listed comparison of percentages may be taken as a rough indication of their light-passage rating from a given light source. Just as it is the size or area of a window that determines how much daylight can enter to illuminate a room, so it is that the size of the aperture opening determines how much light will pass to and through the projection lens and thence to the screen.

The writer has elected herein the standard 0.600 by 0.825-inch sound aperture as representative of 100% in light-passage rating.

By way of further explanation: suppose that a theatre has been regularly operating with a standard sound 1.37:1 aspect ratio aperture, with a 3-inch, F:1.8 projection lens, and has been obtaining therewith 19,000 total screen lumens, and a picture size of 15 by 20.5 feet, which would be 307.5 square feet in area.

Height-to-Width Ratio Vital

It is then decided to use a 1.85:1 (No. 4) aspect ratio aperture with the same size screen and the same projection lens. The picture size will then be the same width, namely 20.5 feet—but only 11 feet high (Fig. 1).

Now, because the light-passing rate of the 1.85:1 (No. 4) aspect ratio is 74% of the 1.37:1 (No. 1) ratio picture, the total screen lumens will be reduced from 19,000 to approximately 14,000—but each square foot of the 1.85:1 (No. 4) picture will, in foot-candles, be as bright as the 1.37:1 (No. 1) picture.

This result ensues because the 1.85:1 (No. 4) aperture

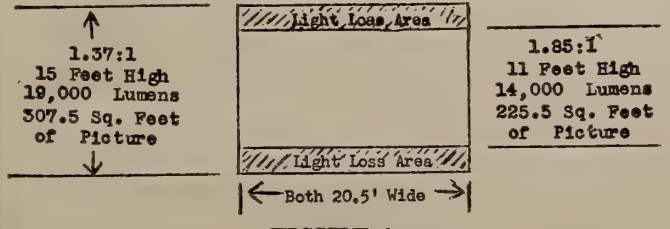


FIGURE 1

is only smaller in height, hence blocks out a part of the light that would pass through the larger 1.37:1 (No. 1) aperture.

Presuming that it is decided that the resultant picture (3-inch lens) of 11 feet high, at the same 20.5-feet width, is lacking in height and should be enlarged to the 15-foot height of the former 1.37:1 (No. 1) aperture picture. After this has been done, the width of a 15-foot high, 1.85:1 (No. 4) aspect ratio picture becomes 27.75 feet wide, and the total area of the picture becomes 416.2 square feet instead of 225.5 square feet—an increase in picture area of 85% (Fig. 2).

Since it is now necessary to illuminate the increased picture area with only 14,000 total screen lumens, let's hypothetically assume that the required shorter 2¼-inch focus projection lens will pass the same amount of light that the former 3-inch focus lens did, in which case the foot-candle illumination of the picture field will drop

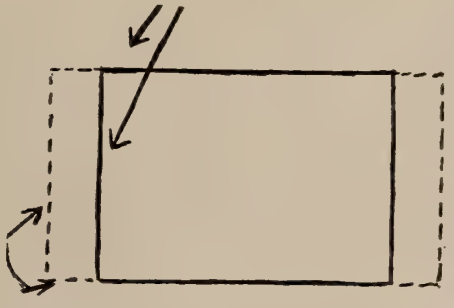


FIGURE 2
Top arrows: 1.37:1 picture of 15 x 20.5 feet; total area 307.5 square feet, 62 foot-candles, or 100%.
Bottom arrows: 1.85:1 picture of 15 x 27.75 feet; total area 416.2 square feet, 22 foot-candles, or 36%—which is 64% less than that obtained with the 1.37:1 ratio. (NOTE: all figures in "total light," with no allowance for shutter or other losses.)

from 62 foot-candles formerly possible on the 15 by 20.5-foot picture field to 34 foot-candles, or approximately 54% on the larger 15 by 27.75-foot picture.

Basic Essentials Still Prevail

However, our hypothetical assumption now must be made *factual* because the shorter 2¼-inch focus projection lens does not pass the same volume of light (foot-candles) as did the longer 3-inch focus lens, even though they both bear the same F:1.8 light-speed marking.

In consequence, to get a true picture of the final results, we must make another deduction of 34% from the already reduced average foot-candle figure of 54%. So in the end we find that, after making all of the projec-

tion changes necessary, to use an 1.85:1 (No. 4) aspect ratio aperture and enlarging its picture to 27.75 feet wide, we end up with an average screen illumination of 22 foot-candles.

Our larger picture with the same light source under these conditions is reduced to only 36% of the level we originally had, when using 1.37:1 (No. 1) aspect ratio aperture and a 15 x 20.5 picture field.

This same formula is applicable to determine the approximate results that will follow the changes from a standard sound 1.37:1 aspect ratio aperture to the apertures designated as Nos. 2, 3, 4, 5 and 10.

2.55/1 (No. 6) CinemaScope vs. 1.37/1 (No. 1) Standard Sound

In order that we keep our evaluations on an even basis, we will retain the same light values, the same picture field size, the same 3-inch, F:1.8 projection lens and light source which we used in the foregoing material covering the aspect ratios Nos. 1, 2, 3, 4, 5, and 10. Consequently, we will start out with a 15 x 20.5-feet picture field obtained from the use of a 1.37:1 standard

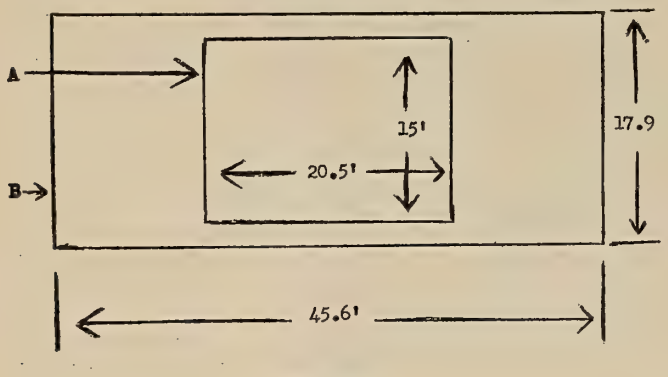


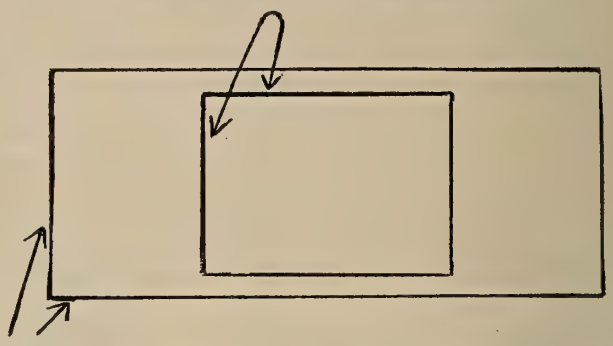
FIGURE 3

sound aperture designated *A* in Fig. 3, and then compare it with a 17.9 x 45.6-feet picture field obtained with the 2.55:1 CinemaScope aperture designated as *B*.

To begin with, because the 2.55:1 CinemaScope uses an aperture opening of 0.715 inches by 0.912 inches in size, the aperture opening area is 32% larger than the standard 1.37:1 sound aperture, hence its total lumen

FIG. 4. Top arrows: original 1.37:1 picture of 15 x 20.5 feet; total area 307.5 square feet, 62 foot-candles, or 100%.

Bottom arrows: final 2.55:1 picture of 17.9 x 45.6 feet; total area 816.2 square feet, 27 foot-candles, or 44%. (NOTE: all figures in "total light," with no allowance for shutter or other losses.)



light-passage rating will rise from 19,000 to 25,000 total screen lumens.

However, because it is necessary in this (No. 6) projection system (also systems No. 7, 8, and 9) to add a prismatic expansion lens to the 3-inch, F:1.8, projection lens, there will follow a loss in the total screen lumen figure (25,000) that will reduce it to 22,000 total screen lumens, or 12%.

This figure of 22,000 now becomes the basis to determine the illumination of the 2.55:1 aspect ratio (17.9 by 45.6-feet) CinemaScope picture field.

Just as a refresher, we restate that the area of our original *A* 1.37:1 ratio, 15 by 20.5-feet picture was 307.5 square feet and that it was illuminated to 62 foot-candles by 19,000 total screen lumens.

For our new CinemaScope 2.55:1 (No. 6) aspect ratio, 17.9 by 45.6-feet *B* picture, its area will be 816.2 square feet, or 165% larger! However, to illuminate this larger area, we have 22,000 total screen lumens, therefore the total foot-candle figure will become 27—which is 56% below the foot-candle illumination of the 1.37:1 (No. 1) 15-feet by 20.5 feet *A* picture field (Fig. 4).

Evaluation of Possible Illumination With Expanded Projection System No. 9

To have a constant basis for comparison, we will continue to keep all projection details as heretofore, thus in

TABLE A

	SYSTEM	ASPECT RATIO	APERTURE OPENING	2 INCH AREA	LIGHT-PASSING RATING
1	Regular	137-1	.600" x .825"	.495"	100
2	"	166-1	.497" x .825"	.410"	83
3	"	175-1	.471" x 825"	.389"	79
4	"	185-1	.446" x .825"	.368"	74
5	"	2-1	.412" x .825"	.340"	69
6	Cinemascope (Magnetic)	2.55-1	.715" x .912"	.652"	132
7	" "	2-1	.715" x .715"	.511"	103
8	Cinemascope (Optical)	2.35-1	.715" x .839"	.600"	121
9	VistaVision (Squeezed)	2-1	.600" x .825"	.495"	100
10	" (Standard)	137-1	.600" x .825"	.495"	100

Carbon Arc Requisites For the New Processes

By H. P. WOODS

The relationship between projector, carbon arc and screen is discussed herein in authoritative fashion by one of England's outstanding technicians. IP is privileged to present these data through the courtesy of its esteemed contemporary, *British Kinematography*—for which, many thanks.

THE projection of wide screen and 3-D films has presented problems in all spheres of projection. An obvious problem has been that of providing a picture of adequate size and brightness within the scope of present-day equipment available for these new techniques. The projector, carbon arc and screen are a group producing a *sensation* of brightness to the eye of the viewer, and it is not possible to divorce these three items when discussing the new methods of film presentation.

Let us first of all examine the properties of the reflecting surfaces used for theatre screens today. It is necessary to refer to a hypothetical surface which we can call a white matte diffusing surface of 100% efficiency, from which all the incident light is reflected.

Screen "Reflection Factor"

If this type of surface is given an illumination of, say, 10 foot-candles, all the light received will be uniformly diffused, so that the light emitted in any direction by the surface is proportional to its projected area in that direction. Because of this, the surface will look just as bright from all angles of viewing, and as the surface is 100% efficient, we would by definition term this brightness as 10 foot-lamberts.

This relation between illumination (foot-candles) and brightness (foot-lamberts) has a factor of 1.0 in the case considered, which is usually termed the "reflection factor" of the surface.

In the practical case of a normal matte theatre screen, some of the

(Continued on next page)

(No. 1) 15 x 20.5-feet screen which, we will recall, was 62 foot-candles.

Fig. 5 we again use as a basis the 1.37:1, 15 x 20.5-feet picture field.

To begin with, because the No. 9 "squeezed" system of VistaVision uses a projector aperture of identical size and area as the standard 1.37:1 (No. 1) sound-picture aperture, its total light-passage rating is likewise 100%. Thus, it will permit 19,000 lumens to enter our 3-inch focus F:1.8 projection lens.

But again we must add a prismatic expansion lens, as is the case with the 2.55:1 CinemaScope system, and therefore we must again deduct 12% from the 19,000 total lumens for its added light loss.

"Working Total" Lumen Figure

Our *working total* lumen figure now becomes 16,700, which will determine the foot-candles of light we will have available to illuminate the 15 x 30-feet VistaVision 2:1 (No. 9) picture field.

As in the foregoing case cited, our original picture field *A* had an area of 307.5 square feet; whereas the new 2:1 (No. 6) VistaVision picture field *B* will have an area of 450 square feet — which is 46% larger!

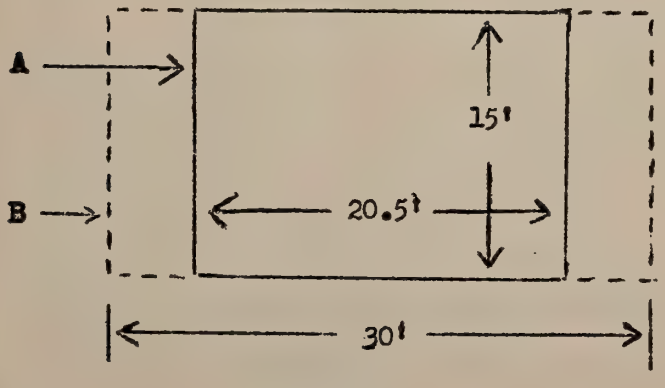


FIGURE 5

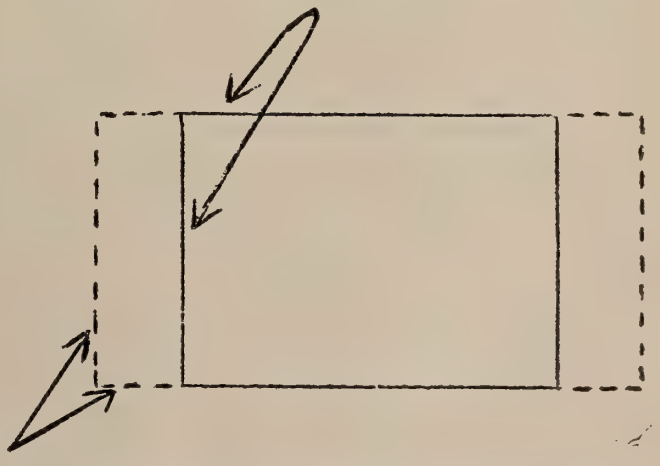


FIG. 6. Top arrows: original 1.37:1 picture of 15 x 20.5 feet; total area 307.5 square feet, 62 foot-candles, or 100%.

Bottom arrows: 2:1 ratio picture of 15 x 30 feet; total area 450 square feet, 37 foot-candles, or approx. 60%. (NOTE: all figures in "total light," with no allowance for shutter or other losses.)

We have 16,700 total screen lumens to illuminate our 46% larger picture area (Fig. 6) thus its level of illumination will be 37 foot-candles, or 40% less, than 1.37:1

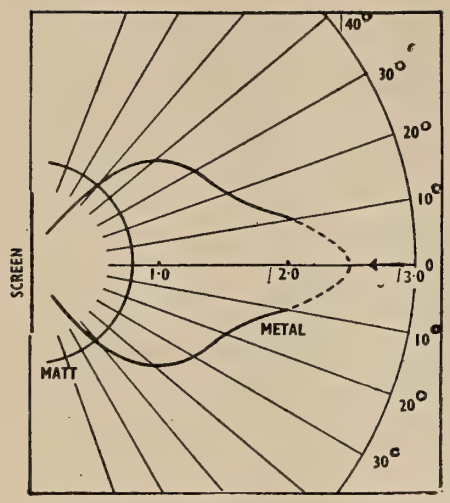


FIG. 1. Horizontal distribution of reflectivity. Normal incidence of light.

incident light is lost to the patron, some having passed both through the screen, and some being absorbed by it. This gives us a reflection factor less than 1.0 in all directions, and it is generally found that a reflection factor (R.F.) of the order of 0.8 is obtained for a new screen when installed. In this case the observed brightness of the screen for an illumination of 10 foot-candles would be 8 foot-lamberts in any direction. The general formula connecting brightness and illumination is:

Brightness (foot-lamberts) = Illumination (foot-candles) × R.F.

Metallized Screen Data

If we examine a typical metallized screen we find that, due to the nature of the surface, the distribution of reflection factor with angle of viewing is quite different from that of a matte screen. Figs. 1 and 2 show the variation of R.F. for normal incidence of light, and for oblique incidence of the light.

On the same diagrams are shown the reflection factor of a typical matte screen. It is observed that at certain angles the R.F. of the metallized screen is considerably in excess of that of a normal matte screen, although it must be realized that the R.F. no longer remains constant at all angles of viewing, so that to some extent the patrons in the side seats will not observe as bright a picture as those in the center. For the same incident illumination a metallized screen will appear twice as bright as a matte screen.

Due to its specular character, the metallized screen surface obeys the normal law of reflection, *i.e.*, angle of incidence = angle of reflection, so that for light incident on the screen at an angle to the normal the screen looks brightest in the direction of the path of the reflected ray. In other words, for steep projection angles of the projector, the patrons in the orchestra will have a brighter picture than does the projectionist.

Illumination of the Screen

As is well known, the illumination of the screen by the straight coppered carbon arc increases progressively with current and carbon size over the positive-size range of 6-mm to 9-mm. The total illumination on the screen (the product of the screen area and the mean foot-candles over the screen) is conveniently expressed in "lumens."

A typical family of curves showing screen lumens plotted against arc current is shown in Fig. 3. It illustrates that, depending upon the grade of

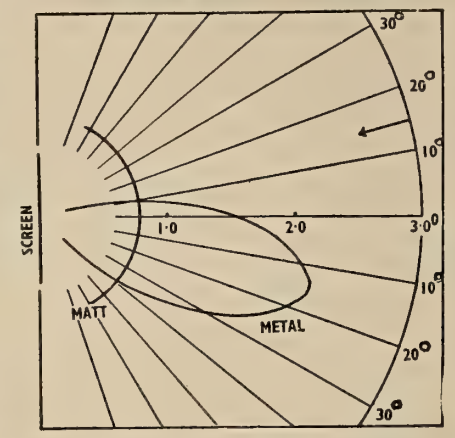


FIG. 2. Vertical distribution of reflectivity. Light incident at 15° to normal.

carbon used, more light may be obtained from one type than another even at the same current, so that a wide choice of carbon size and grade is available for particular conditions in any theatre.

The British Standard of screen brightness refers to the center picture brightness, which in turn is derived from the foot-candles at the center of the screen. For simplicity, a typical distribution of screen illumination can be taken as follows.

Left	Center	Right
50	80	50
70	100	70
50	80	50

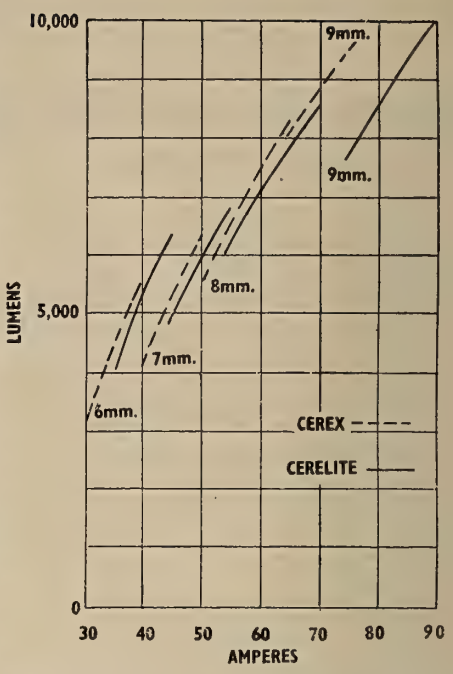


FIG. 3. Screen light curves; 1.33:1 aspect ratio; f/1.9 bloomed lens; 50 per cent flicker shutter cut off.

in which the *average* illumination on the screen is 75% of the center illumination. Thus, screen lumens = screen area × 0.75 center illumination; therefore, center illumination =

$$\frac{\text{lumens}}{0.75 \times \text{screen area}}$$

From this simple formula it is possible to predict the centre foot-candles from a trim of carbons if the available lumens and screen size are known. Carrying this reasoning a little further, if the width of the screen is W feet, for normal aspect ratio the height is:

$$\frac{0.6}{0.82} W = 0.73\ W$$

Hence the screen area is $W \times 0.73\ W = 0.73^2$, from which we obtain:

$$\text{illumination at centre} = \frac{1.82 \text{ lumens}}{W_2}$$

The British Standard of screen brightness at the center of the screen is 8 to 16 foot-lamberts so that if we accept a value of the order of 10 foot-lamberts as a satisfactory brightness (which allows for some deterioration in screen reflectivity and potential light absorption due to atmospheric conditions) the following center foot-candles are required to obtain this brightness on the two types of screens already mentioned.

In the case of the standard new

matte screen, the center illumination should be:

$$\frac{10}{0.8} = 12.5 \text{ foot-candles}$$

and with a typical metallized screen:

$$\frac{10}{1.5} = 6.7 \text{ foot-candles.}$$

Substituting these values in the last equation, curves have been drawn (Fig. 4) to show the lumens required to produce a nominal brightness of 10 foot-lamberts for two typical materials for screens of varying widths. These curves apply to a normal brightness and allow for some deterioration in the reflective properties of the screens with age and at different angles of viewing.

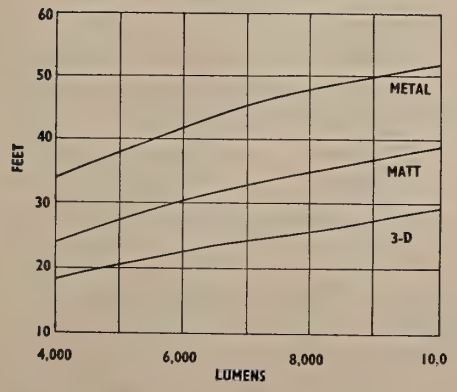
Where aspect ratios are changed by top-and-bottom masking of the gate aperture, the curves still apply, since some of the available light is obviously lost by the introduction of the masking and this light is not redistributed over the wide-aspect-ratio screen.

This does not apply to a projection system such as CinemaScope, where the available light is redistributed over the screen. From the light efficiency standpoint, such systems have a distinct advantage over top-and-bottom masking, and a better picture illumination is obtained for similar screen widths.

From the light output given by the carbon trims available, it may be seen that screens up to 50 feet wide can be illuminated to a very satisfactory level of brightness with the metallized-type of screen.

The normal system of projection of three-dimensional films requires that two images corresponding to right-eye and left-eye views be projected simultaneously onto the screen by plane-polarized light, the planes of polarization of the two pictures being at right angles. By viewing through analyzing spectacles, the right eye can only accept the right-eye picture and the left eye the left-eye picture.

FIG. 4. Screen width vs. lumens; 10 foot-lamberts at center.



We need only consider the system for one projected image and eye, as the two eyes viewing two separate pictures do not make the picture look twice as bright.

The light from the projector passes through a polarizing filter, only about 38% of the light emerging as plane-polarized light. The picture produced by this light is viewed through the approximate spectacle filter which transmits about 80% of the plane-polarized light. This means that as far as the viewer is concerned the light is reduced by some 70%. Because a matte screen to some extent depolarizes the plane-polarized light, so that a double image would be seen, only the metallized screen is suitable, and as it has the added advantage of a higher reflection factor it, to a large extent, offsets the losses due to polarization.

Using the formula previously developed and allowing for the filter factors of the polarizer and viewer, it is possible to calculate the lumens required to illuminate screens of various widths. This is shown in Fig. 4, in which it must be appreciated that some 8000 lumens are required to give a 10 foot-lambert picture 25 feet wide. With lower output from the arc-lamp, either smaller pictures must be projected or a lower brightness tolerated. It is evident that 3-D presents a greater light-problem than wide screen or CinemaScope.

Film Damage a Vital Factor

The demand for more light for 3-D and wide screen means that the film itself is subjected to a greater intensity of light. Already with our normal arclamps we are at the point where film buckle or embossing, with its attendant out-of-focus effects, can be seen during projection. This effect is more noticeable with black-and-white films than with color, as the latter transmits more infra-red radiation.

When using carbon trims designed for the higher light values, it will be necessary to reduce film heating by using infra-red filters, which have the effect of reducing the infra-red rays more than the visible rays so that the film is kept cooler. There is some loss of visible light too, but this may be offset by a small increase in arc current.

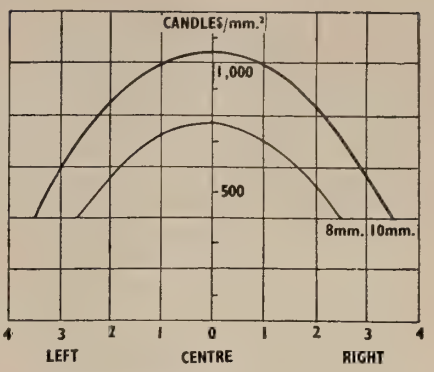


FIG. 5. Distribution of crater brilliancy.

As the filter absorbs a large amount of heat energy, suitable cooling of the filter by air blast is indicated to prevent fracture.

Arc-Trim Running Time

In the case of wide screen or CinemaScope projection using standard reels with running times of the order of 20 minutes, all the carbon trims discussed have burning rates which allow for adequate projection time in the average arclamp. However, where only two projectors are available for 3-D presentation, and longer running time without retrimming is required, some compromise must be made.

Running time is a function of carbon-burning rate, and feed travel of the carbon holders. The latter varies considerably from lamp to lamp, and it is necessary to consider each lamp and choose a trim to allow the time to be achieved.

For burning times of the order of 50 minutes, the burning rate of the positive carbon is usually the limiting factor. In this case, the use of 9-mm positive carbons gives an advantage, as by a suitable choice of current a low burning rate may be obtained with an advantage in light output over that of the smaller sizes of carbons. This is illustrated in the following table.

Positive Size	Burning Rate in./hr.	Current	Light
9-mm	10.5	65	100
8-mm	10.5	59	92
7-mm	10.5	48	78

The sizes and types of carbons

available today enable us to choose the best trim for all conditions of operation, but it must be realized that more light output and longer running time are diametrically opposed, and with conventional arclamps some compromise has to be made which must influence the size of screen used.

Larger Carbon Trim Requisites

The introduction of 10-mm and larger coppered positives in the conventional straight-arc lamps may require some modifications of the lamp to give satisfactory performance. To achieve any worthwhile increase in screen light over that of the 9-mm positives requires current values of more than 100 amperes. To obtain a satisfactory steadiness under these conditions of burning, a very carefully-adjusted magnetic control is required, otherwise the handling of the trim during burning is very sensitive. In lamps with the negative inclined at an angle, the arc is somewhat easier to regulate.

At the same time the lamp optics should be designed to use the larger crater to its best advantage. A mirror designed to give adequate gate coverage with 7-mm and 8-mm positives would have a relatively greater wastage of light at the gate when used with the larger craters produced on 10-mm carbons.

Lamps with Rotating Positives

10-mm and larger positives are now burned in rotating-positive lamps which are modified versions of the prewar lamps involving in some cases the use of water-cooled jaws and reduced protrusion of positive beyond the jaws. Special carbons designed for these lamps are burned at much higher current densities than before, producing high crater brilliancies and high burning rates.

In some cases "fast" 16-inch mirror systems are used to collect the crater light, while others, particularly the larger positives, have condenser systems. The high crater brilliancy and large crater of these arcs produce higher light values, which are most suitable for the illumination of large screens.

Figure 5 shows the distribution of crater brilliancy of a trim of 10-mm rotating positives with 9-mm negatives burning at 120 amperes as compared with that of a standard 8-mm copper-coated carbon at the nominal current of 65 amperes.

The 10-mm carbon produces a maximum crater brilliancy of the order of 1150 as against 790 candlepower per square mm. by the conventional trim. A high intrinsic brilliancy is maintained with the larger carbon over a much larger area than on the 8-mm positive. This enables a high level of luminous flux to be produced with a suitable optical-collecting system.

It is essential, of course, that with this source of high-intensity light, suitable heat-absorbing filters are used between the film and the lamphouse.

Recapitulation of Data

If the conventional arclamps available today are combined with the new types of metallized screen, adequate screen brightnesses are obtainable on screens exceeding 50 feet in width.

In the case of 3-D presentation, due to the light losses in the polarizing and viewing filters, smaller screens up to 28 feet wide have been accepted, unless a lower standard of screen luminance is tolerated. In most cases the use of 9-mm positives is recommended on the score of light output vs. burning rate.

Where longer burning time is required for 3-D using only two projectors, some reduction in screen size is necessary if screen luminance is to be maintained, as the carbon trims have generally to be run below their maximum ratings to accommodate the available feed-travel.

Larger trims of carbons of the rotating type are available for suitable lamps to produce higher luminous output where required. This type of arc, due to its higher light output, makes the use of infra-red filters essential in order that film damage due to heating at the gate may be eliminated.

The performance figures indicated are not the maximum possible but are those of established and tried arcs giving practical results in theatres.

Researches show that higher values of light output are possible when they are required but their use may be limited by the potential damage to film despite the use of heat-absorbing filters.

Light Requirements for Wide-Screen Projection

By ARTHUR J. HATCH
Strong Electric Corporation

THAT the wide screen is here to stay is confirmed by the policies and commitments of major film producers to release their future better pictures either in the CinemaScope or VistaVision processes. With a blessing on these two systems given by most film producers, the exhibitor can proceed to equip his theatre secure in the knowledge that the equipment he purchases will be suitable for the projection of whatever wide-screen system may eventually prevail.

Those theatres already equipped for CinemaScope have learned whether or not they have ample screen illumination on the basis of their screen size. Theatres that have not as yet installed a large screen and may or may not have suitable projection lamps can approach the problem of solving their light requirements from two angles: first, that of determining how much light they will need to project a picture of the size which they intend to install; or second, determining how large a picture they can present with their present projection arclamps.

With both wide-screen systems of projection with their vastly increased screen area, there is a general requirement for more screen illumination than has been necessary heretofore.

Aperture Area Control Factor

As the matter of film apertures and aspect ratios has been pretty well established for these systems, it is possible to present a few facts and comparisons from which conclusions can

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the sponsors of this revolutionary form of motion picture presentation which has revitalized and strengthened immeasurably the standing of our industry throughout the world, salute the technicians who contributed so abundantly of their talents to the overwhelming success of CinemaScope.

A special nod of appreciation is due theatre projectionists, whose craftsmanship was a vital factor in the widespread public acceptance of this new form of entertainment.

It is within our power, pulling together, to make an enduring contribution to the exacting art of showmanship.

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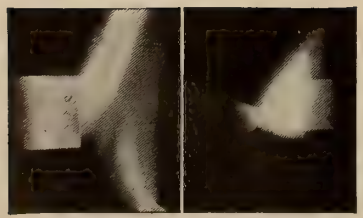


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be drawn that will obviate a period of expensive experimentation.

It is generally recognized that the maximum amount of light that can be put through present projection systems using existing designs of powerful arclamps and optical systems depends principally upon one factor, the area of the aperture. For instance, using the most powerful lamps, it is usually possible to put about 6500 lumens through a 16-mm aperture. Using the same lamp it is possible to project approximately 23,500 lumens through a 35-mm aperture, which has about 4 times the area of the 16-mm aperture.

Since the amount of light which is available to the screen depends primarily upon the area of the picture aperture, to compare the requirements of the various projection systems it becomes necessary to examine them on the basis of aperture area.

Comparison of Aperture Areas

Most of the wide-screen systems proposed use either an anamorphic type lens to expand the size of the picture, or a cut-down aperture to accomplish the extended picture ratio. For instance, the non-anamorphic VistaVision system makes use of an aperture which is 0.825 inch wide (the same as the standard motion picture aperture which has been in use since the advent of sound) by 0.446 inch high. These dimensions give an aspect ratio of 1.85 to 1 to the picture when projected with a non-anamorphic lens. This aperture has an area of 0.368 square inch.

The system whereby VistaVision employs anamorphic prints uses the present standard aperture 0.825 in. by 0.600 in. and obtains the wide-screen effect with an anamorphic lens that has a magnification of 1½ to 1. As the ratio of the standard aperture is 1.33 to 1 and is anamorphized with a 1½ to 1 ratio, the total aspect ratio of the final projected picture is 2 to 1. This standard aperture has an opening area of 0.495 square inch.

Values of Various Systems

The CinemaScope projection system makes use of a still larger aperture, one that is 0.912 x 0.715 inch. The extending of the width of this aperture was made possible by relocating the sound tracks, as was done with the stereophonic magnetic sound on the CinemaScope print. The area of this aperture is 0.652 square inch, the largest of the systems used for general release and consequently it will pass the most illumination. The CinemaScope aperture has an aspect ratio of 1.27 to 1, and is used in connection with a 2 to 1 magnification anamorphic lens to give the projected picture a resultant ratio of 2.55 to 1—if elected.

The recent decision to release optical prints in CinemaScope necessitates the uses of an 0.839 by 0.715 inch aperture, or a ratio of 1.17 to 1, which when projected by the regular 2:1 anamorphic lens results in a picture aspect ratio of 2.35:1. Area of this aperture is 0.600 square inch.

Comparing the light that can be put through these four apertures, we have the old standard-width, cut-down VistaVision aperture with a 1.85 to 1 ratio to which we will assign a value of 100 units, based on the area of 0.368 square inch. Accordingly, to the 0.825 x 0.600 aperture used with the 1½-to-1 ratio anamorphic lens, and which has an area of 0.495 square inch, we must assign a value of 135 units, since this size aperture passes 35% more light than the first-described aperture. It follows then that the CinemaScope optical track aperture, with an area of 0.600 square inch rates 163 units, since it projects 63% more light than the first-described aperture.

The CinemaScope magnetic print aperture with an area of 0.652 square inch projects 77% more light than the first-described aperture, or 177 units.

Since the powerful lamp referred to previously, without projector shutter running, puts 17,500 lumens through the non-anamorphic VistaVision aperture, it follows that 23,500 lumens can be put through the anamorphic VistaVision aperture; 28,500 through the optical CinemaScope aperture, and 31,000 lumens through the CinemaScope magnetic print aperture.

Screen Widths Possible

Taking the example of a drive-in theatre which has been equipped with the most powerful arclamps projecting to a 66 x 50 foot white screen with the standard 1.33:1 aspect ratio, it is interesting to compare the size of pictures that can be obtained with each of these new wide screen projection systems to obtain the identical unit brightness on the screen in all cases.

Taking the case of the non-anamorphic VistaVision system and assuming that the picture will be projected to a matte white painted screen, the width of the screen that can be utilized would be 66 feet. In the case of anamorphic-type VistaVision, the width of the screen that can be accommodated would be 78 feet wide; optical-print CinemaScope screen width could be 92 feet, and in the instance of magnetic-track CinemaScope the screen width could be 100 feet. All figures given for systems using anamorphic lenses have recognized the existence of a light loss of about 8% introduced by the anamorphic lens attachment.

If the screen, instead of having a

SUMMARY OF WIDE-SCREEN PROJECTION SYSTEMS

NOTE: THE VALUE OF 4-FT. LAMBERTS APPLIES ONLY TO DRIVE-IN THEATRES.

System	Aperture Size	Aperture in Sq. In.	Lumens Thru Aperture	Type of Screen	Aspect Ratio	Screen Size: 4-ft. Lamberts at Center	Width Ratio Factor
Standard VistaVision non-anamorphic	0.825 x 0.600	0.495	23,500	matte white	1.33:1	66 x 50	1.00
VistaVision anamorphic	0.825 x 0.446	0.368	17,500	matte white	1.85:1	66 x 36	1.00
VistaVision non-anamorphic	0.825 x 0.600	0.495	23,500	matte white	2:1	78 x 39	1.18
CinemaScope anamorphic optical sound	0.825 x 0.446	0.368	17,500	aluminized	1.85:1	89 x 48	1.35
CinemaScope anamorphic magnetic sound	0.839 x 0.715	0.600	28,500	matte white	2.35:1	92 x 39	1.40
VistaVision anamorphic	0.912 x 0.715	0.652	31,000	matte white	2.55:1	100 x 39	1.52
CinemaScope anamorphic optical sound	0.825 x 0.600	0.495	23,500	aluminized	2:1	102 x 51	1.55
CinemaScope anamorphic magnetic sound	0.839 x 0.715	0.600	28,500	aluminized	2.35:1	122 x 52	1.85
	0.912 x 0.715	0.652	31,000	aluminized	2.55:1	133 x 52	2.00

matte white surface, is an aluminized paint surface with a reflection factor of approximately 1.4, the non-anamorphic VistaVision picture width could be 89 feet; the anamorphic VistaVistion 102 feet, the CinemaScope optical picture 122 feet, and the CinemaScope magnetic track picture 133 feet in width, which incidentally, is about the maximum size that is being used in present day drive-ins.

The accompanying chart shows these various figures for the different types of projection systems and different types of screens. All the figures shown are based on the use of the most powerful projection arclamp available today, and the sizes of the screen are calculated so that a brightness of 4 foot-lamberts will be obtained in the center of the screen when the shutter is running. This figure of 4 foot-lamberts is a little bit above the average brightness we find in most drive-in theatres today.

Screen Brightness Levels

To explain how these screen widths have been arrived at, take, for example, the magnetic-track CinemaScope system which is calculated to have a 133-foot width for 4 foot-lamberts center brightness.

When the center brightness on a screen is 4 foot-lamberts, and with the typical distribution pattern, the average brightness over the whole surface of the screen is found by test to be 2.9 foot-lamberts.

With the screen having a reflective factor of 1.4, it is only necessary to project 2.05 foot-candles to the screen to realize that 2.9 foot-lamberts brightness. The 31,000 lumens which this powerful lamp can deliver through a CinemaScope aperture and standard $f/2.0$ optics is reduced by the 50% shutter loss and the 8% anamorphic lens loss, so that the incident light on the screen is 14,350 lumens.

Width-Ratio Factor

Therefore, since lumens are the product of average foot-candles x screen area, we obtain the area that we can illuminate to this 2.05 foot-candles intensity by dividing 14,350 by 2.05 for a resulting screen area of 7000 square feet. The picture width can be computed by taking the square root of the product of screen area times screen aspect ratio, which in the example cited calculates to 133 feet wide. The other calculations in the chart were made in a similar manner for the other projection systems and screens.

Assuming any particular theatre to have ample screen illumination on a matte screen using standard-size aperture, the screen width that can be illuminated to the same brightness for any of the wide-screen systems can be calculated by multiplying the present screen width by the "width ratio factor" given in the last column of the accompanying chart.

For example, if your own theatre presently has a 50-foot wide picture with standard projection on a white screen, and you wish to determine the width of matte white screen that can be illuminated to the present level of brightness with the VistaVision anamorphic system, simply take the present standard picture width and multiply it by the "width-factor ratio" of 1.18 from the chart. The resultant width in this example would be 59 feet.

The illusion of *living presence*, the sole advantage of all the new screen techniques, can only be realized with an increase of screen width of from 1.75 to 2 times over that heretofore employed for standard projection.

Accordingly, it is readily evident that most theatres will require the most modern and powerful projection arcs in order to meet the requirements of a sufficiently increased screen width for proper presentation of all wide screen techniques.

Your Guide to Proper Lens Selection

By M. D. O'BRIEN
Director of Sound and Projection, Loew's Theatres

WITH VistaVision and other wide-screen processes looming large on the technological horizon, the selection of the proper projection optics is of vital importance—not tomorrow, not next week, not next month but *now!* We projectionists understand that these optics are in the wide-angle, short-focal length category.

As the only technically-minded personnel in and about the theatre, the projectionist craft is now called upon to discarge a very serious obligation. The charts and accompanying text presented here afford precise information as to the proper lens for a given screen width at a given projection "throw."

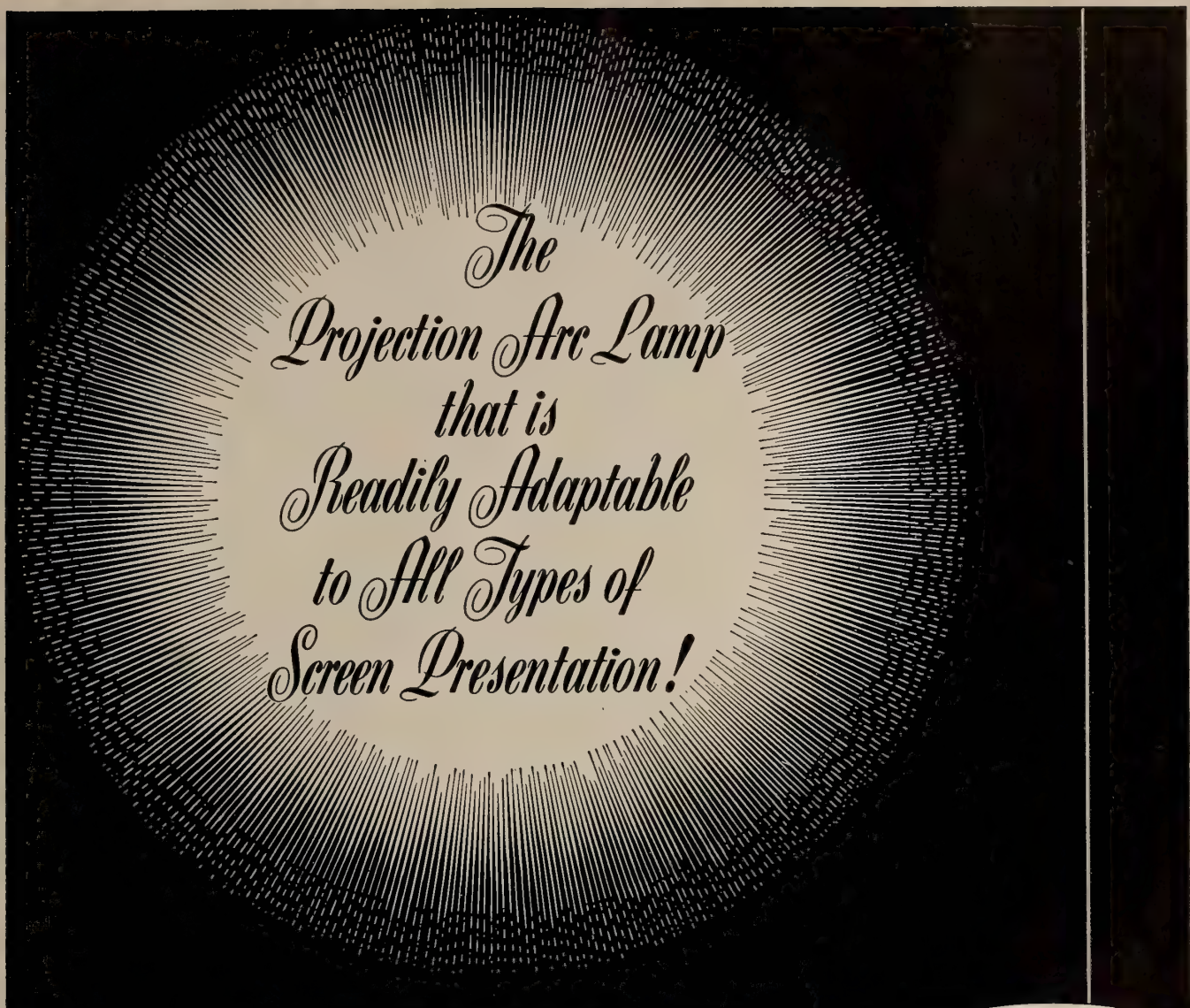
Constantly possed are such questions as: What focal-length lens is needed to get, for example, a 40-foot picture in a theatre where the throw is 125 feet and the proscenium arch is 20 feet high? The catch here is that with a 40-foot wide picture in such a theatre, all pictures would have to be shown in an aspect ratio of at least 2 to 1. Therefore a compromise must be made.

To answer questions of this kind quickly and, at the same time, accurately, the writer prepared the charts shown herein. Let us consider the first chart. If, for instance, a projectionist wants to know what focal-length lens would be required to obtain a picture 40-feet wide in his theatre if the throw is 125 feet, he can find out by reading down the left-hand column to 125 feet and then reading across to the column listing lenses for a 40-foot screen.

There he will find that a 2.6-inch lens would be needed to get exactly this size picture in this particular situation. However, since projection lenses are generally available only in quarter-inch sizes, exactly this size picture cannot be obtained. It would be necessary to compromise on a slightly large picture using a 2.5-inch lens, or a slightly smaller picture using a 2.75-inch lens.

Height-to-Width Relationship

The second chart determines the height of a picture of a specified width when various aspect ratios are used. It is useful in coping with situations such as the following: As mentioned previously, a picture 40-feet wide in a theatre where the proscenium arch is only about 20 feet high, would result in a situation where all pictures would have to be shown in an aspect ratio of at least 2 to 1, and few pictures are now available that can be masked that much



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The arc is stabilized by a stream of air which maintains a prescribed system of ventilation of the area surrounding the arc. This air jet prevents the hot tail flame of the arc from reaching the reflector, supplies enough oxygen so that no black soot is produced, and keeps white soot from collecting on the reflector in such quantity as to absorb heat which would cause breakage.

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at the aperture without cutting off action.

In the upper righthand corner of the first chart is a box listing the aperture sizes required to project various aspect ratios. Extreme ratios such as 2.66 to 1 or 2.5 to 1 are included, although at present they probably are not feasible. The light loss and, of course, the fact that large sections of the picture would be cut off would make such projection impractical.

Height-to-width ratios as extreme as this are obtained in the CinemaScope process through using a full aperture and an anamorphic lens.

Setting up a high-quality wide-screen system can be a tricky process. Other important factors are the sight lines from the rear of the auditorium, the balcony and other parts of the theatre.

THROW	SCREEN WIDTHS 20'	22'	25'	27'	30'	32'	35'	37'	40'	42'	45'	47'	50'	52'	55'	57'	60'	62'	65'
	LENS SIZES																		
50	2.1	1.9																	
55	2.3	2.1																	
60	2.5	2.3	2.0																
65	2.7	2.4	2.1	2.0															
70	2.9	2.6	2.3	2.1	1.9														
75	3.1	2.8	2.5	2.3	2.1	1.9													
80	3.3	3.0	2.6	2.4	2.2	2.1	1.9												
85	3.5	3.2	2.8	2.6	2.3	2.2	2.0	1.9											
90	3.7	3.4	3.0	2.8	2.5	2.3	2.1	2.0	1.9										
95	3.9	3.6	3.1	2.9	2.6	2.4	2.2	2.1	2.0	1.9									
100	4.1	3.8	3.3	3.1	2.8	2.6	2.4	2.2	2.1	2.0									
105	4.3	3.9	3.5	3.2	2.9	2.7	2.5	2.3	2.2	2.1	1.9								
110	4.5	4.1	3.6	3.4	3.0	2.8	2.6	2.5	2.3	2.2	2.0	1.9							
115	4.7	4.3	3.8	3.5	3.2	3.0	2.7	2.6	2.4	2.3	2.1	2.0	1.9						
120	5.0	4.5	4.0	3.7	3.3	3.1	2.8	2.7	2.5	2.4	2.2	2.1	2.0	1.9					
125	5.2	4.7	4.1	3.8	3.4	3.2	2.9	2.8	2.6	2.5	2.3	2.2	2.1	2.0	1.9				
130	5.4	4.9	4.3	4.0	3.6	3.4	3.1	2.9	2.7	2.6	2.4	2.3	2.1	2.1	2.0	1.9			
135	5.6	5.1	4.5	4.1	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.4	2.2	2.1	2.0	2.0	1.9		
140	5.8	5.3	4.6	4.3	3.9	3.6	3.3	3.1	2.9	2.8	2.6	2.5	2.3	2.2	2.1	2.0	1.9	1.9	
145	6.0	5.4	4.8	4.4	4.0	3.7	3.4	3.2	3.0	2.8	2.7	2.5	2.4	2.3	2.2	2.1	2.0	1.9	
150	6.2	5.6	5.0	4.6	4.1	3.9	3.5	3.3	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9
155	6.4	5.8	5.1	4.7	4.3	4.0	3.7	3.5	3.2	3.0	2.8	2.7	2.6	2.5	2.3	2.2	2.1	2.1	2.0
160	6.6	6.0	5.3	4.9	4.4	4.1	3.8	3.6	3.3	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.2	2.1	2.0
165	6.8	6.2	5.4	5.0	4.5	4.3	3.9	3.7	3.4	3.2	3.0	2.9	2.7	2.6	2.5	2.4	2.3	2.2	2.1
170	7.0	6.4	5.6	5.2	4.7	4.4	4.0	3.8	3.5	3.3	3.1	3.0	2.8	2.7	2.6	2.5	2.3	2.3	2.2
175	7.2	6.6	5.8	5.3	4.8	4.5	4.1	3.9	3.6	3.4	3.2	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.2
180	7.4	6.8	5.9	5.5	5.0	4.6	4.2	4.0	3.7	3.5	3.3	3.2	3.0	2.9	2.7	2.6	2.5	2.4	2.3
185	7.6	6.9	6.1	5.7	5.1	4.8	4.4	4.1	3.8	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.5	2.5	2.3
190	7.8	7.1	6.3	5.8	5.2	4.9	4.5	4.2	3.9	3.7	3.5	3.3	3.1	3.0	2.9	2.8	2.6	2.5	2.4
195	8.0	7.3	6.4	6.0	5.4	5.0	4.6	4.3	4.0	3.8	3.6	3.4	3.2	3.1	2.9	2.8	2.7	2.6	2.5
200	8.3	7.5	6.6	6.1	5.5	5.2	4.7	4.5	4.1	3.9	3.7	3.5	3.3	3.2	3.0	2.9	2.8	2.7	2.6

APERTURE SIZES			
2.66	to 1	.310	x .825
2.5	to 1	.330	x .825
2.25	to 1	.366	x .825
2.00	to 1	.412	x .825
1.85	to 1	.446	x .825
1.78	to 1	.463	x .825
1.75	to 1	.471	x .825
1.66	to 1	.497	x .825
1.5	to 1	.550	x .825
1.37	to 1	.600	x .825

This table shows the size of the lens required in order to obtain a screen size of the desired width at any projection throw. The box in the upper right corner shows the exact dimensions of wide-screen operatures.

Width	1.50	1.66	1.75	1.78	1.85	2.00	2.25	2.50	2.66	STANDARD
20	13.3	12	11.4	11.2	10.8	10.0	8.9	8.0	7.5	14.5
22	14.6	13.2	12.6	12.4	11.9	11.0	9.8	8.8	8.3	16.0
25	16.6	15.	14.3	14.0	13.5	12.5	11.1	10.0	9.4	18.1
27	18.0	16.2	15.4	15.2	14.6	13.5	12.0	10.8	10.1	19.6
30	20.0	18.	17.1	16.9	15.2	15.0	13.3	12.0	11.3	21.8
32	21.3	19.2	18.3	18.0	17.3	16.0	14.2	12.8	12.0	23.2
35	23.3	21.	20.0	19.7	18.9	17.5	15.6	14.0	13.2	25.4
37	24.6	22.2	21.1	20.8	20.0	18.5	16.4	14.8	13.9	26.9
40	26.6	24.	22.8	22.5	21.6	20.0	17.8	16.0	15.0	29.0
42	28.0	25.3	24.0	23.6	22.7	21.0	18.7	16.8	15.7	30.0
45	30.0	27.1	25.7	25.3	24.3	22.5	20.0	18.0	16.9	32.6
47	31.3	28.3	26.9	26.4	25.4	23.5	20.9	18.8	17.7	34.0
50	33.3	30.	28.6	28.1	27.0	25.0	22.2	20.0	18.8	36.1
52	34.6	31.3	29.7	29.2	28.1	26.0	23.1	20.8	19.5	37.8
55	36.6	33.1	31.4	30.9	29.7	27.5	24.4	22.0	20.8	40.0
57	38.0	34.3	32.6	32.0	30.8	28.5	25.3	22.8	21.4	41.4
60	40.0	36.1	34.2	33.7	32.4	30.0	26.7	24.0	22.6	43.6
62	41.3	37.3	35.4	34.8	33.5	31.0	27.6	24.8	23.3	45.0
65	43.3	39.1	37.1	36.5	35.1	32.5	28.9	26.0	24.4	47.2

This table shows the height to within 1/10th of a foot of the screen in relation to its width and to the aspect ratio of the projected image. Figures on top line of each column relate to the specific aspect ratio.

FAIRCHILD ANSWERS

6 Pointed Questions About PERSPECTA STEREOPHONIC SOUND

A FRANK DISCUSSION OF THE FACTS!

Q. *Is Perspecta Stereophonic Sound really here?*
A. It sure is! M-G-M, Paramount and Warners are releasing all future productions with Perspecta Sound. Other studios are following.

Q. *Will it be the industry standard for years to come?*
A. Yes, it will – because, from the producers' viewpoint, it's the *compatible* system – yet offers exhibitors the finest stereophonic sound at the lowest installation and operating cost.

Q. *How soon should theatre owners install it?*
A. The sooner, the better. All Loew's theatres are being equipped now and hundreds of others here and abroad have ordered! Be first in *your* community. Order now!

Q. *How many Fairchild Perspecta Integrators does a theatre need?*
A. Only *one!* A single Fairchild Perspecta Integrator serves *all* projectors in a booth and controls the sound through any three-channel sound system of standard-make.

Q. *What about costs and installation time?*
A. The Fairchild Perspecta Integrator costs $990. A complete installation can be made in less than a day – without loss of showing time and, incidentally, without continued maintenance and replacement of magnetic heads!

Q. *Where do I go to find out more?*
A. See your dealer or – call – write – or wire Fairchild. We understand exhibitors' problems—can answer your questions immediately.

FAIRCHILD RECORDING EQUIPMENT
THEATRE EQUIPMENT DIVISION • WHITESTONE 57, NEW YORK

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...the new all-purpose silver screen the choice of thousands of theatres

Take it from the sales figures... RCA Dyna-Lite Screens are now bringing out the best in good pictures for theatre patrons by the million. You'll find the reasons right in Dyna-Lite's construction... with feature after feature to make Dyna-Lite ideal for any 2-D, 3-D or wide-screen film.

With an RCA Dyna-Lite Screen, there's no light loss ... for its entire surface is uniformly aluminized to add extra brightness. Rugged seams are invisible to the audience, thanks to special electronic welding. And your Dyna-Lite Screen need never show wrinkles. Its tear-proof vinyl plastic can be stretched drum-tight, and seams are extra strong, too.

An RCA Dyna-Lite Screen is flame proof ... as well as highly moisture resistant. It cleans quickly and easily ... with only a duster on the front surface, plus a vacuum on the rear for thorough dust removal.

At a far lower cost than you'd imagine, you can give your patrons all these Dyna-Lite benefits that add up to a better view of better pictures. Small or large, your house can have a made-to-order RCA Dyna-Lite Screen now! Call your RCA Theatre Supply Dealer.

THEATRE EQUIPMENT
RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DIVISION CAMDEN, N. J.
In Canada: RCA VICTOR Company Limited, Montreal

The construction and components of various types of photocells are discussed in this the second of a series of three articles.

An Evaluation of Optical Sound

By ROBERT A. MITCHELL

IN 1873, Willoughby Smith, an Englishman, discovered the interesting fact that crystalline selenium, a semi-metallic element resembling sulfur in its chemical properties, changed its resistance to the flow of current with changing illumination. Selenium is a rather poor conductor, but it conducts current about eight times better when light shines on it.

Lead oxysulfide, cadmium sulfide, thallium oxysulfide, and molybdenum sulfide are other substances which display lower electrical resistance when illuminated. Of these, only lead oxysulfide is sufficiently responsive to rapid variations of illumination to be of any use in sound reproducing systems. Selenium "photoconductive" cells are widely used in relay circuits actuated by light, but are useless for sound reproduction.

Another type of photocell, called the "barrier" or "photovoltaic" cell, consists of two dissimilar substances in close contact. In 1883, Charles Fritts of England constructed such a cell by coating selenium with a film of metal so thin as to be semi-transparent. In improved form this cell is the familiar photronic cell used in projection for controlling the feeding of carbons in modern high-intensity reflector arc-lamps.

A copper-oxide photovoltaic cell, known commercially as the Photox cell, is similar. Both of these cells actually *generate* large currents under the influence of light. They are very useful for control applications and photometry — photographers' light meters utilize them — but, like the selenium photoconductive cell, they do not respond to rapid changes in illumination.

The Modern Photocell

Now we come to the "photoemissive" type of photocell, the kind used in soundheads. This kind of cell depends for its operation on the emission of electrons (the fundamental units of electricity) from substances "excited" by light. The history of this cell began in 1887 when Heinrich Hertz, the German physicist who discovered radio waves, found that ultraviolet light falling on a high-voltage spark-gap enabled the spark to pass more easily than when the gap was not illuminated. And in 1888 the observation was made by other scientists that ultraviolet radiation increased the rate of discharge of a negatively-charged body.

It was conclusively proved in 1899 by Philip Lenard of Germany and J. J. Thompson of England, working independently, that *light causes the emission of electrons from substances.* A knowledge of this important principle made possible the invention of the modern photocell.

Lenard continued his investigations of the "photoelectric effect;" and in the course of his researches he construced the first photoemissive cell having a resemblance to the phototubes familiar to projectionists.

Lenard's Photocell

Lenard's photocell consisted of an evacuated quartz-glass bulb in which was placed a freshly-polished zinc plate and a platinum wire to capture electrons emitted from the plate. When the zinc plate was connected to the negative terminal of a high-voltage battery, and the platinum wire to the positive terminal, a sensitive galvanometer in the circuit showed that a small current passed through the vacuum between the zinc plate (cathode) and the wire (anode) when, and *only* when, the zinc was illuminated by ultraviolet light.

Then the discovery was made by Lenard that the ultraviolet-illuminated zinc plate acquired a small positive charge when the cell was *not* connected to the battery. This he correctly interpreted as a release of electrons from the zinc under the influence of radiation. The leakage of electrons continued only until the residual positive charge left on the plate prevented any more electrons from leaving. The high-voltage battery merely replaced the electrons lost from the plate and prevented a positive charge from forming.

The swarms of electrons flying from the cathode (plate) to the anode (wire) could be swerved from their course by magnetic and electric fields. This phenomenon enabled Lenard to discover the interesting fact that the velocity of the emitted electrons is not affected by the intensity of the radiation illuminating the plate but is dependent only on the wavelength of radiation. The shorter the wavelength of the light, the higher the speed of the electrons.

The Nature of Light

These facts suggested to Albert Einstein his *special theory of relativity* in which he postulated that light is composed of separate little bundles of radiant energy called *quanta* which spread farther and farther apart with increasing distance from the source of the light.

One of the offshoots of this far-reaching theory was the Einstein photoelectric equation which contains two terms from which the photoelectric "threshold-frequency" may be calculated. This function represents the longest wavelength capable of causing the emission of electrons from an electric conductor. One of its factors, the photoelectric "work-function," is so great for most metals that only radiation of the shorter wavelengths (such as ultraviolet light) produces emission.

Very few metals are capable of emitting electrons under the influence of visible radiation, and all of these happen to be the rather weird metals of the alkali and alkaline-earth families, namely: Lithium, Sodium, Potassium, Rubidium, Caesium, Vir-

ginium*, Calcium, Strontium, Barium and Radium*.

Chemical compounds of a few of these strange metals are quite common. The chloride of sodium is ordinary salt. Caustic potash is potassium hydroxide. Calcium oxide is quicklime. Salts of strontium and barium are used in colored fireworks. Caesium, the metal used in modern photocells, is rather rare. Important deposits of minerals containing caesium compounds are found in Maine.

Potassium Used First

Potassium was used in the first sound-movie photocells. Pure metallic potassium is a soft, silvery metal that floats on water. To throw a piece of potassium into water is, however, a dangerous experiment because it sometimes explodes. Ordinarily it merely sputters and dances over the surface of water, combining with it so vigorously that the hydrogen gas liberated often catches on fire, burning with a flame colored purple by potassium vapor.

Sodium is also lighter than water, but not quite so active chemically as potassium. It seethes and hisses in water to form a solution of lye, but not enough heat is generated to ignite the hydrogen evolved. Rubidium is even more active than potassium, and caesium is the most hot-tempered.

Caesium is a beautiful, silvery metal, almost twice as heavy as water, and as soft as lead. Like sodium and potassium, caesium must be stored in containers filled with kerosene to protect the active metal from the air. Potassium rusts very quickly in the air, but caesium ignites spontaneously when exposed to air, burning with a bright blue flame and giving off a dense, corrosive smoke of white dust. On a warm day caesium melts to a silvery liquid resembling mercury.

"Noble" Gas Required

In order to use these active metals we must work with them either in a vacuum or in an artificially created atmosphere of some totally inert gas such as helium, neon, or argon. The fierce chemical activity of these metals also prevents their extraction by ordinary metallurgical methods. They are obtained commercially by electrolysis of their melted salts in special high-temperature apparatus which permits collection of the liberated globules of metal in the absence of air.

The curious metals used in producing the light-sensitive surfaces in photocells were described in last month's installment. Let us now examine the old potassium cell and then some of the modern types of photocells. The potassium cell, remembered by projectionists as a silvered bulb-shaped affair requiring an "anode potential" of about 250 volts, is shown in Fig. 3. Devised by the German scientists Elster and Geitel, the bulbous potassium cell was the first ever used for commercial sound-on-film movies.

The empty glass bulb was first silvered internally, and a circular area of silver was removed to provide a window for the admission of light. A very thin layer of potassium was then coated on the silver by vaporization. The finished cell was entirely empty except for a ring, or loop, of wire to serve as the anode to which the electrons stream.

Vacuum-Type Photocells

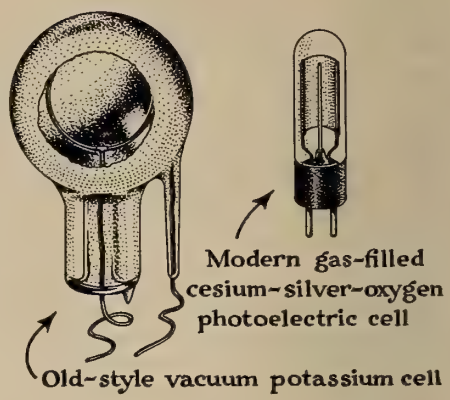
The earliest photocells were completely evacuated. The response-characteristics of vacuum-type phototubes are remarkably "flat," the current output being directly proportional to the intensity of illumination falling upon the cathode of photosensitive metal. Vacuum-type cells of a more modern construction still are manufactured, finding a wide application for wirephoto service, photometric and colorimetric measurements, and relay control. RCA's 934 vacuum phototube is suitable for sound-on-film reproduction.

To increase the sensitivity of the old-style potassium cell, a little oxygen was admitted and a carefully controlled high-voltage glow-discharge produced inside the cell. This treatment left the potassium in a highly sensitive colloidal, or finely divided, state. After pumping out the excess oxygen, a small amount of helium (a chemically inert gas) was introduced into the bulb. This later type of potassium cell, the first of a large family of gas-filled phototubes, was from five to eight times more sensitive than the vacuum cell.

Gas-Filled Cell Action

How does gas at very low pressure make photocells more sensitive? In the vacuum cell all of the electrons

FIG. 3. Types of photocells.



which reach the anode and flow off through the wire as a current must come from the photosensitive cathode. When light strikes the cathode, electrons leave the metal and form a cloud in front of it. The voltage-impressed source applies a force to the free electrons, impelling them to travel to the positively-charged anode. The stream of electrons continues to flow as long as light shines on the cathode and the cell is connected to a source of D. C.

The gas-filled cell works just like the vacuum cell, but the atoms of gas floating about in the tube quite frequently get smacked by electrons flying from cathode to anode. Because gas atoms also contain electrons, these collisions knock out electrons which join the stream of photoelectrons travelling to the anode. The current is thereby greatly increased.

But that is not all that happens. When an atom of gas loses one or more of its electrons, it becomes a positively-charged atom called an *ion*. The charge is necessarily positive because the loss of an electron means the loss of a negative charge from a neutral atom.

Interaction of Forces

Being positive, the gas ions migrate toward the negatively-charged cathode, for it's a rule that dissimilar charges attract one another. The bombardment of the photosensitive cathode by the gas ions shakes loose still greater numbers of electrons from the cathode. The moment these electrons get free, they join the crowd and hustle across the tube to the anode. So while the vacuum-type cell produces only electrons loosened from the cathode by the direct action of light, the gas-filled cell has not only

(Continued on page 38)

* Virginium is extremely rare. No one has yet obtained a sufficient quantity of its compounds to isolate the pure metal. Radium is radioactive, and hence unfit for use in photocells.

Excerpts from an address by a noted exponent of only the very best in projection quality, as originally given before the recent IA 42nd Biennial Convention in Cincinnati.



Past, Present – and Future (?)

By MERLE CHAMBERLIN

Director of Projection, Metro-Goldwyn-Mayer Studios

MY TOPIC is the so-called "new look" in motion pictures, Hollywood angle. My preparations for this talk consisted mainly of a concentrated session with my crystal ball. We are still in what I estimate as a state of flux, as far as some portions of the technical end of the industry are concerned.

For about 15 years . . . we sailed along . . . and then Cinerama opened up, which didn't affect too many of us but shot the gun that gave a terrific boost to the box-office. That boost is continuing. Not quite two years ago "Bwana Devil" in 3-D opened in Los Angeles. The Alliance was called upon to do a terrific job, technically speaking . . . and you have been told many times how well you responded.

"Experts" vs. Actual Achievement

I do not feel that Hollywood did too badly. Bear in mind the fact that a major industry, a multi-billion-dollar industry, did a retooling job in a very short time.

One thing that gave us trouble all over the country was the plague of "experts" we ran into. Everybody who was selling sun glasses in a drug store became an optical expert as far as motion pictures were concerned. Anybody who had anything to do with exhibition started making reels that wouldn't work . . . and most of these people obtained enough backing to print lurid ads in the trade papers which our exhibitor friends read and believed.

Most of our "executives" in the industry became "experts." . . . Not 10% of the people in this auditorium were consulted on these technical changes. We had the spectacle of people "inventing" all-purpose lenses and telling exhibitors that they wouldn't have to spend any more money.

General Trade Press Failed

Certain portions of the trade press let us down. They printed all those stories and . . . did not label them as press releases from the manufacturers' standpoint, making everyone's job in the IA that much tougher.

Here is one sentence from the July 22nd issue of *Daily Variety*, which is read by everyone in Hollywood, the only question being whether they read that first or the *Racing Form:*

> "Vox pop: many complaints about the focus on wide screen and 'Scope pix can be directly traced to sloppy projectionists and not to the film processes."

Many phone calls on that forced them to take it back the next day, but in a left-handed way. These are things we have to watch . . . and if any of us read anything wrong in the papers we should start calling them on it.

Double-Film 3-D is Dead

I think that double-film 3-D is dead—a gone pigeon. I do not believe that single-film 3-D is dead: there are now three or four single-film systems, double printing and projecting through a prism. Polaroid is working on a Vectograph system in which the polarization is printed on both sides of the celluloid, with filters eliminated. There is very little loss of light.

Wide screen: the various aspect ratios started out in quite a jumble—1.5/1, 1.66/1, 1.85/1 and 2/1—even prior to CinemaScope. There was no agreement on standards because the product on the shelf could not be adopted to a specific standard—an economic reason and a good one.

On Stage 16 at M-G-M Studios we have an experimental projection set-up, including everything we could think of with which to project a picture—*but* nothing that can't be purchased on the open market. We at M-G-M don't believe in technical adjuncts not readily available to exhibitors or projectionists in the field.

Yet, despite this view, we have 14 sets of apertures for each projection machine! so as to run anything and everything that has been made. We project a 61-foot picture on that stage at 125 amps.

Aspect Ratio Situation Jelling

Aspect ratios: excepting newsreels, the aspect ratio craze has seemingly settled down to 1.75/ or 1.85/1. I know that many of you are projecting pictures at 1.66/1, because that is the easiest, but everything being photographed in Hollywood today, in what they call "wide screen," is being composed for 1.75/ or 1.85/1, although still being printed for the 3/4 aperture for those theatres not yet equipped for anything else.

M-G-M is today shooting everything in 1.75/1, in addition to CinemaScope or whatever else they are using in the special deals. All of the studios are convinced that the old 3/4 picture is gone and that the wider aspect ratio is here to stay.

Present CinemaScope Projection

Now, varying aspect ratios call for various lenses. At M-G-M we have adopted what we call the "rubber" (variable focal length) lens, a take-off of the old stereopticon lenses which, attached to the regular lens, enables you to fill just about any screen size you desire. We have found this to be very successful.

CinemaScope has scored terrific gains since its introduction; but I

(Continued on page 36)

In The SPOTLIGHT

The function of this department is to provide a forum for the exchange of new and views relative to individual and group activities by members of the organized projectionist craft and its affiliates. Contributions relative to technical and social phases of craft activity are invited.

THE production of motion pictures abroad has been for years a major preoccupation of IA studio workers and a serious problem for the International. One can hardly blame a producer who travels to Italy, to Austria, to Germany, or to England to shoot a feature-length production. On the other hand, one must not at his peril admit the technological know-how of Hollywood to be atrophied.

This is the extremely difficult situation confronting the IA on the occasion of the recent visit to this country (and to the recent IA Convention in Cincinnati) of Tom O'Brien, who directs the destinies of the organized craft in the British Isles. O'Brien's problem is no less acute than that of IA President Walsh, and they both have the primary objective of maintaining a high level of employment. Every foot of film shot on foreign shores represents an economic loss to our American technicians.

Nationalism as such may not be expressed in terms of visual-audio components, which know no boundaries. One may not look askance, however, at our Hollywood brethern seeking added employment. We have welcomed to these shores through many years the best technological brains that Europe has to offer, and it would be a pity if the artistic and technological talents of this industry were to be washed ashore on a tidal wave of misunderstanding.

Admittedly a very difficult problem to solve, it would seem that the suggestion by IA President Walsh that Labor be represented in all future international conferences relative to the production of motion pictures here and abroad represents a sound approach to this vexing question.

The fundamentals of this problem were explored by President Walsh at a recent press conference, a summary of which is appended.

If Labor were represented at all conferences on foreign-film agreements, even though it be in the role of an observer or advisor, it might serve to "overcome pitfalls" that are likely to present themselves in negotiations on foreign agreements.

Press reports indicated that Walsh was thinking along the following lines:

Eric A. Johnston, head of the MPAA, thought the idea of having Labor sit in at conferences on foreign pacts was a good one if it could be "worked out." However, "it has not been worked out yet."

In commenting on his talks with Tom O'Brien, general secretary of NATKE (National Association of Theatrical and Kinematograph Employes) on the British labor leader's complaints on the stand on U. S. production in England, Walsh reported that the two had "reached an understanding" looking to the solution of the problems involved by talking them over before they "become aggravated."

According to Walsh, the understanding provides that in any case where a British or American producer made a picture abroad for no other reason than that it was cheaper would be submitted to discussion.

Walsh said that the IA was "wondering" how it could work out a similar arrangement with unions, or, failing in that, with government agencies in other countries. The IA will shun such an arrangement with any foreign film unions that are Communist-dominated.

Walsh said he especially was opposed to the production abroad by Americans of Tv pictures that are used to promote the buying of American products. It was held inconsistent to ask Americans to purchase American products through the medium of pictures made abroad by U. S. video-film producers.

Walsh said that "runaway" production — that is, the production of pictures abroad merely to save money—would be resisted by the IA.

• M. D. O'Brien, director of sound and projection for Loew's Theatres who is now convalescing from an extended ilness, has asked this department to express his gratitude for the numerous messages of good cheer which he received from members of the craft throughout the country. These messages reached such an imposing total as to preclude the possibility of personal reply, thus Obie's desire to reach the very much larger audience provided by IP.

Here's hoping Obie's recuperative powers match the high standard of his projection work during the past years.

• Mention of Obie automatically brings to mind his life-long friend (and our constant critic) P. A. McGuire. Our thoughts of Mac were all on the sunshiny side until we received from him a flippant postcard from the cooled vales of New Hampshire (it was 96° that day in New York) telling us how very, very much he was enjoying the verdant New England dells.

You know, of course, that Mac added thereto the snide remark that "Better Projection Pays," a remark calculated to give us no surcease after just having typed an item anent the heat-on-film problem. That's Mac for you—always needling from afar, the while he coos pious platitudes within arm's reach.

• The annual Fall meeting of the New York State Association of Motion Picture Projectionists will be held at the American Legion Home in Ithaca, N. Y. on Monday, October 4 at 2 p.m. Business of the day will include the election of officers for the next two years.

Ithaca Local 377 will be host for the event, and extensive plans have been made to insure for all the delegates a pleasant time. The day will end with a banquet to which the delegates and guests are invited. The Ladies Auxiliary will have all the facilities of the Legion Home at their disposal during the day.

• The recent death of Harry Headland, business representative for Local 287, Rochester, Penn., broke up a

working partnership of almost 25 years. Back in August 1923, William H. Howe, present secretary of the Local, served his apprenticeship under the auspices of Headland, who was then in charge of the projection room at the old Majestic Theatre in Rochester. When the Oriental Theatre opened in 1931, both men were transferred there and worked together for almost 25 years.

• New two-year contracts, retroactive to September 1, 1953, have been concluded between Toronto Local 173 and the circuit and independent theatres in its jurisdiction. Under the terms of the new pact, the members will receive a 5% increase in wages, plus a raise of 25c per hour on overtime. Manpower—two men per shift—remains unchanged. Pay for midnight shows, to be held *only* between the hours of 12:05 a.m. and 3 a.m. is increased to $17.50. Provision is also made for a two-week vacation per man, with pay.

Representing Local 173 at the negotiations were A. L. (Pat) Travers, business representative, and executive board members J. Sturgess, L. Lodge, R. Higgins, A. Kerrin, D. Siegel, R. Wilson, L. Applebaum, and R. O'Connor.

• Both higher wages and shorter hours have been won by the sound service engineers employed by RCA and Altec, under the terms of a new contract recently concluded between the IA and the service companies.

The new agreement, which ended talks extending over a period of several months, is retroactive to August 22 last and calls for a 5% wage increase, bringing the basic weekly scale to $136.50. The basic weekly scale for soundmen covering more than one geographical area is raised to $159.43. The work week will be cut from 48 to 44 hours for a two-year period, after which it will be further reduced to 40 hours.

The contract also calls for the companies to furnish automobiles for the men when needed. However, in an emergency, not to exceed 30 days, a soundman will be paid 7c per mile for the use of his car.

Representing the IA at the negotiations were General Secretary-Treasurer Harland Holmden, International Vice-President Harry J. Abbott, and IA representative Joseph D. Basson. W. L. Jones, vice-president of RCA Service Co., in charge of the Technical Products Division, and H. M. Bessey, executive vice-president of Altec Service Corp., represented the employers.

SAN FRANCISCO LOCAL OBSERVES ITS 50TH ANNIVERSARY











Shown in this group of photos are members and guests of San Francisco Local 162 as they gathered to celebrate the Local's recent 50th anniversary. In photo at top left are officers of Local 162 group behind the anniversary cake: back row (left to right) are Herman J. Lehrbach, secretary-treasurer and Lawrence H. Weaverling, business representative; center row: Oscar Brostrom and James T. Luther Sr., executive board members, and William Van Ornum, vice-president; front row: Norman E. Moynahan, president; Paul G. Zern and Antone Salemi, executive board members.

In the photo at bottom left are shown (standing) President Moynahan, who presented a 50-years membership pin to (standing at his left) William W. Lewis; (seated) Albert "Duke" Murray and Charles Zielinski, members of the Local.

Pictured at top right are business representative Weaverling and Helmar Erickson, life member of the Local; middle right: Robert Bemis, honorary member of the Local and manager of Walter G. Preddy Theatre Supply Co., and H. J. Lehrbach; bottom right: John Turturici, secretary of District Council 1 and business representative of Local 409, San Mateo, Calif., and W. Van Ornum, president of District Council 1 and vice-president of Local 162.

• The IA scored another advance in the Tv field recently *via* a ruling by the National Labor Relations Board which invalidated an election held by the employes of station KFSD-Tv of San Diago, Calif., which was won by the IA's arch Tv rival, NABET. Details in the case are supplied by the following excerpt from the report by the NLRB trial examiner:

"Recommends that company cease and desist from restricting its employes by rule or otherwise from engaging in union activities on company property during non-working time; from unlawfully assisting NABET by permitting only that labor organization to meet wtih its employes on company property; from making pre-election speeches to employes on company time and property so long as it maintains a rule prohibiting union access to company property on non-working time; or from in any other manner interfering with, restraining or coercing employes in the exercise of the right to self-organization, to form labor organizations, to join or resist IATSE or any other labor organization; and post compliance notices for 60 days.

"At the same time, the trial examiner recommends that the election held on April 13, 1954, be set aside, finding that company's conduct improperly interferred with the election."

Perspecta Sound Operational Data

By MARK STEPHENS

WHEN 3-D bowed in we were burdened with stereophonic sound recorded on a separate sound film. This system, requiring a synchronized magnetic reproducer, went out when CinemaScope came in. And now the new multi-directional Perspecta process threatens to overlay magnetic reproducers with cobwebs. Note we said *multi-directional*, not *stereophonic*.

True stereophonic sound involves a special recording technique as well as a reproducing system consisting of several amplifiers and stage speakers. The sound which is to be reproduced from two or more speaker units must be picked up by the same number of microphones in the studio, the electrical output of each being recorded *in a separate sound-track*.

Synthetic Stereo Sound

Much of the so-called "stereophonic" sound heard in theatres is a purely synthetic product. It is "faked" during the re-recording procedure to produce only the *effect* of natural stereophonic. The reproduced sound is directional, but it is not truly stereophonic.

The writer has heard both types of sound in CinemaScope pictures: true stereosound derived from three separate microphones on the movie set, and the merely directional type of sound concocted in the re-recording room. Be that as it may, the CinemaScope magnetic sound process is capable of true stereosound because it makes use of three (sometimes four) *independent* sound records.

Sound *quality* is something else again, and in this regard magnetic sound has been the target of numerous industry brickbats. Projectionists soon noted the noise-pickup and partial erasure of the magnetic tracks, the "fuzzy" sound resulting from magnetic-head wear, and the sharp clicks and pops produced by splices.

Theatregoers, no less than film critics, while sharply divided over the merits and faults of wide-screen projection, manifested an almost complete lack of enthusiasm for "stereophonic" sound.

Magnetic recording is expensive and troublesome, and the magnetic-striped prints cost almost twice as much as similar color prints carrying standard optical soundtracks. When Metro broke through the magnetic-sound barrier stranglehold by releasing its CinemaScopers in an optional standard-track version, it came as no surprise to anybody.

Perspecta "Directional" Sound

At this juncture there arrived on the scene a simplified directional-sound process which, armed with modest equipment requirements and conventional film and sound-track standards, is called Perspecta.

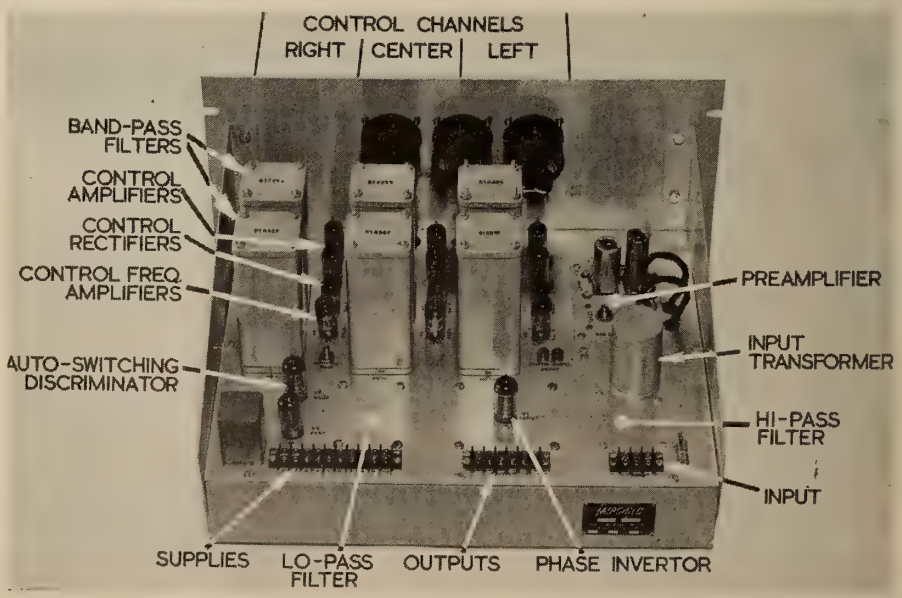
Invented by C. Robert Fine, engineered by Fairchild, and backed by M-G-M and Loew's, Perspecta is not true stereophonic sound but merely *directional* sound. It provides a means for channelling the sound from a single optical track to one or more of the three speaker units installed behind the screen. Perspecta sound is recorded in the usual single-channel manner, and it does not require a directional quality until the single soundtrack is "doctored" during re-recording.

In Perspecta sound three inaudible, or subsonic, low-frequency tones are mixed with the audible sound record during the final preparation of the soundtrack. The continuously varying signal-strength of these three tones, inaudible to the audience, act as controls to vary the volume of each of the three speakers—this for directional sound effects.

Function of the Integrator

The subsonic tones, called carriers, can be "heard" only by the Perspecta "integrator" which receives the total output of the soundhead photocells. The integrator unit is nothing more than an electronic switching device which directs the single-track sound output to the proper amplifiers, and thence to the proper speakers behind the screen.

The frequencies of the subsonic carrier tones used in Perspecta sound are 30, 35, and 40 cycles. These are



Components of the Perspecta integrator unit showing the hi-pass and the low-pass filters, the voltage-supply and the output terminals. This stripped-down view (in reverse) of the integrator shows all the important components of the unit, which should always be rack-mounted so as to provide for speedy and efficient servicing. NOTE: The extreme simplicity of this unit make unnecessary any extensive servicing, but what little service work is necessary may be safely entrusted to the national service companies' staffs which are intimately acquainted with the circuitry and operation of the assembly.

added to the track in the studio after the sound has been recorded. When the 30-cycle tone is superimposed on the sound record, the integrator will send the sound to the speaker behind the left-hand side of the screen. The 35-cycle tone activates the center channel; the 40-cycle tone the right-hand channel. If two or three carrier-tones are used *simultaneously*, sound will issue from *two* or *all three* of the stage speakers.

Perspecta sound has been hailed enthusiastically even by exhibitors who have had their fill of stereophonic sound and prefer regular single-channel sound emanating from the center of the screen. The reason for their enthusiasm is found in the fact that the three subsonic carrier-tones do not interfere with normal single-horn reproduction from the optical track. It is thus possible to use the same track for either regular or directional reproduction; and unless you want directional sound, there is nothing to buy.

Only One Integrator Required

Only one integrator is needed for Perspecta sound reproduction, regardless of the number of projectors. Also required are three amplifiers and three speaker units. Theatres equipped for CinemaScope already have the necessary amplifiers and speakers.

The Perspecta integrator may be obtained with or without a built-in preamplifier and impedance-matching transformers. If the projector soundheads are already equipped with photocell amplifiers, the "zero-gain" integrator may be used.

The output terminals of both soundheads (or preamplifiers) are connected to the input terminals of the integrator. Each of the three sets of integrator output terminals is connected to the proper main amplifier of the sound system.

The three main, or power, amplifiers are fitted with a "ganged" potentiometer to permit the projectionist to adjust the sound volume of the entire 3-channel system by means of a single volume control. A switch on the integrator enables a choice between directional and center-horn, non-directional reproduction.

The Perspecta sound integrator also embodies an automatic switch that directs sound output to the center speaker alone when all carriers read less than "20" on the three subsonic signal-strength meters on the front panel of the integrator. A steady carrier-reading of "50" on any one or more of the meters automatically returns the unit to directional-sound operation (see illustrations).

The simplicity of the automatic switch will be appreciated by all projectionists. It is not necessary to "ride" the integrator controls when non-directional films are spliced into a reel of Perspecta film: the integrator, activated by the strength of the carrier signals, takes over the switching chore.

The integrator is essentially an ingenious combination of band-pass filters. The main filter separates the three subsonic frequencies (below 60 cycles) from the audible sound frequencies (70 to 10,000 cycles).

The subsonic signals next encounter a set of three narrow-band filters which separate them (30, 35, and 40 cycles) and cause them to flow in separate circuits. Each of these filters is designed with a band-width of about 2 cycles to permit proper operation of the device, with projector speed variations of 4% above or below normal.

The A.C. from each of the three

(Continued on page 34)



Front panel view of the Perspecta integrator unit as it looks when installed in the projection room.

"Excellent Projection Equipment . . ."

• • • •

A Personal Message from Adolph Zukor

It has always been our policy that pictures should be capable of being played in any theater in the world. Therefore, we recommend standard sprocket-hole film and standard position, single, optical sound track. To improve the exhibition of pictures, we do feel that screens should be as high and as wide as the theater can install.

A year ago last May we released SHANE as the first of the wide-screen pictures from Paramount and have since perfected the VistaVision process to still further improve the definition and quality of picture. The first of the VistaVision pictures to go into release will be WHITE CHRISTMAS, to be released in October. Perspecta sound has been added to VistaVision prints and may be used, if desired, by any theater which has the proper equipment.

With regard to the shape of pictures on the screen, we are convinced that the most artistic shape is in a ratio of approximately 1.85:1, and we also find that this shape best fits the great majority of theatres. In the future we are confident that the best in the presentation of motion pictures will be obtained with VisaVision prints shown on a high, wide, seamless screen of this shape, and using excellent projection equipment.

ADOLPH ZUKOR

Chairman of the Board, Paramount Pictures Corp.

LETTERS TO THE EDITOR

To the Editor of IP:

We have installed CinemaScope here, using a flat screen with a picture 26 feet wide. We have a 90-foot throw from the film aperture to screen and no stereophonic sound—just a single optical track. This CinemaScope installation has created a puzzling problem, as follows: When the picture hits the screen it appears to be all off balance. The vertical lines of walls, buildings, etc., seem to be curved in at the top and bottom, and background scenery appears to move in waves across the screen. It is a situation which I have never encountered before, and I've seen CinemaScope in other theatres, but never anything like the distortion that occurs in this theatre. The installing engineer, however, seems to think that everything is O. K.

The anamorphic lenses are set for 90 feet to meet the manufacturer's requirements and are attached to an old set of 6-inch lenses. These lenses are badly scratched and also balsam-blemished, but the focus seems sharp enough. The anamorphic lenses are made by Bausch and Lomb. Do you think the trouble is caused by the old objective lenses or by the anamorphics?

We have checked the keystone in the theatre and corrected it. We have also turned the anamorphics completely around so that the picture made a complete circle around the screen, but no matter what the position the vertical lines still had a curve in them. Maybe you could shed some light on this situation for us.

Many of us are shifting about, and I would not want to miss any issue of IP, as the information in these books sometimes proves many an argument.

ARNOLD HUMPHREY

Bathurst, New Brunswick, Canada

Long-Range Forecasting

WITHOUT having seen or tested Mr. Humphrey's CinemaScope setup, IP can only hazard an off-the-cuff opinion, i.e., that the distortion-trouble will be found in the opticatl system consisting of projection lens and anamorphic attachment.

One naturally thinks first of the screen when a case of distorted CinemaScope arises. The problem submitted by Mr. Humphrey has a number of unusual aspects, however. These rule out his flat 26-foot screen as the cause of the trouble.

A steep projection angle is ordinarily at fault when the vertical lines of walls, buildings, *etc.*, seem to slant in toward the top of the picture; but a downward tilt of the projectors cannot possibly result in a "slanting in" at the bottom. I assume that vertical lines in this case actually follow more or less smooth curves.

In any case, the position and flatness of the screen should be checked, and the keystone effect of an excessively steep projection angle partially mitigated by slanting the screen backward at the top by not more than 5 degrees. From what Mr. Humphrey says, we assume that the screen is perfectly stretched and lined-up.

What we ought to know is this: are the distortions described by Mr. Humphrey *visible from the projection room?*

As is commonly known, purely geometric distortions caused by projection angle and by screen wrinkles and an incorrect positioning of the screen are practically invisible to projectionists. Their viewing angle so nearly coincides with the optical axis of the projection set-up, that the picture looks fairly good from the projection room even when severe geometric distortions all but ruin the picture for persons seated in the auditorium.

Optical Mismatch Indicated

Let's suppose that the distortions mentioned—including the wavy appearance of the background detail—are clearly visible from the projection room. The trouble then boils down to the lenses.

There is evidently a peculiar optical mismatch between the old 6-inch lenses and the CinemaScope anamorphic attachments. But no matter which is at fault—projection lens or anamorphic attachment—the difficulty seems definitely to reside in the *combination* of the old lenses and the new anamorphic attachments.

Unless the anamorphics are of the wrong type, it would seem that the old 6-inch lenses are based on an optical design which is incompatible with the characteristics of the anamorphic attachments. Suspicion centers upon the lenses, rather than the anamorphics, because the anamorphics give the same unsatisfactory performance when turned around 180 degrees.

If a perceptible change takes place in the distortions when the distance between lens and anamorphic unit is radically changed, then it is all the more likely that the old projection lenses and the anamorphics cannot be optically reconciled. And, in such a case, the lenses and anamorphics should be *rigorously* investigated.

One cannot be absolutely sure, of course, that the anamorphics are of the right type. The manufacturer of these units should be supplied with as much data as possible — projection throw and angle; serial and model numbers of the anamorphics; make and serial number of the old projection lenses, their focal length and barrel diameter; your suspicions as to whether the projection lenses have ever been rebuilt or otherwise tampered with, and an exact description of the appearance of the CinemaScope pitcure from various viewing angles. It would be well, also, to give detailed information about the screen, including its size, type of surface, whether flat or curved, the make, and who installed it.

Lens Test Imperative

Even though we feel that the trouble is caused by a serious optical mismatch it might be advisable to get a *modern* 6-inch lens on loan in order to make a test. If the picture looks good with the loaned lens, then a pair of similar lenses should be purchased and installed at the earliest possible moment. If, however, the distortion persists, something is radically wrong with the anamorphics. That's the only way you can be absolutely certain as to which unit is causing the trouble.

The engineer responsible for the instalation of CinemaScope is responsible for the projection results, and he has no right to question your judgment. In no case should an installing engineer leave a theatre with projection conditions which are manifestly unsatisfactory.

1A OBITUARIES

HARRY E. HEADLAND, SR., business representative for Local 287, Rochester, Penna., died suddenly on August 25. Although under the doctor's care for the past several years, he continued his work as projectionist at the Oriental Theatre in Rochester until the day of his death. He took an active interest in union affairs since he was initiated into the Local in October, 1913. He served as recording-corresponding secretary for many years, and for the past eight years held the office of busines representative. For 34 years he was employed by the Rochester Amusement Co., 23 years of which he worked in the projection room of the Oriental Theatre. Prior to that he worked at the old Majestic Theatre. Surviving him are his wife, two daughters and two sons.

FRANK J. DILLON, 57, member of Local 521, Long Beach, Calif., succumbed to a heart attack recently. He began his career as projectionist in South Dakota in the early 1900's, moving to California in 1937. He became a member of Local 521 on March 6, 1947 and worked in a number of theatres in and around Downey, Calif. until about four years ago, when ill health forced him to retire. He is survived by his wife, a son and a daughter.

EVERETT L. COVINGTON, 63, member of Long Beach, Calif. Local 521, died suddenly several months ago. He worked at the Fox West Coast Theatre in Long Beach for about 25 years, and at the time of his death



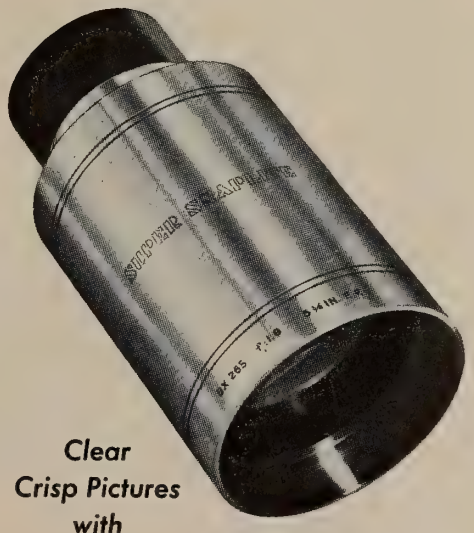
The late Everett L. Covington, member of IA Local 521, Long Beach, Calif.

he was chief projectionist at the Crest Theatre. Everett Covington was initiated into Local 521 on April 20, 1922, only two months after the Local was chartered. He was a member of the executive board and served as a permanent member of the sick benefit committee. Surviving are his wife, a daughter, a son, two sisters, and two grandchildren. His son, Russell, is also a member of Local 521.

Ethyloid Into Larger Quarters

Vastly increased demand for Ethyloid film cement has forced its manufacturer, the Fisher Mfg. Co., to move into greatly expanded production space at 1185 Mt. Read Blvd., Rochester 6, N. Y. Peak production of Ethyloid in the new quarters will be attained within a brief period thus insuring a constant flow of product to all accounts.





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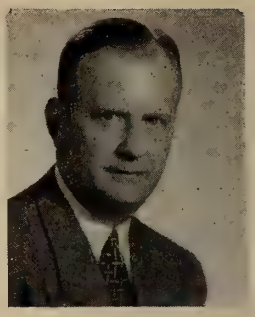
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PERSONAL NOTES

DR. FREDERICK E. TERMAN, dean of the school of engineering, Stanford University, has been elected to the board of directors of the Ampex Corp., Redwood City, Calif., manufacturer of magnetic sound reproduction equipment for theatres. He replaces Charles McSharry, who relinquished his directorship to become secretary of the board.

ELMER O. WILSCHKE has resigned as operating manager of Altec Service Corp. to become vice-president in charge of operations for Fine Sound, Inc., which operates one of the largest and most complete commercial recording studios in the East. Fine developed the Perspecta stereophonic sound method of recording now being used by a number of major Hollywood studios.

Wilschke, pioneer in the field of sound, joined ERPI (Electrical Research Products, Inc.) in 1928, following an association with Western Electric. During the early days of sound motion pictures he served in various capacities in this country and abroad. Upon formation of Altec Service Corp. in 1937, he became manager of the company's division office located in Philadelphia. From 1941 to 1946 he was Plants Manager of Altec Lansing Corp. in Los Angeles. He returned to Altec Service in 1946, and since 1948 he has been operating manager.



E. O. Wilschke, vice-persident in chareg of operations for Fine Sound, Inc.

Wilschke has served on many technical committees in the industry and has made a number of worth while contributions to the sound equipment manufacturing and servicing field. Announcement of Wilschke's successor as Altec operating manager will be made shortly.

HENRY S. HERSCHMAN has been appointed advertising manager of the Radiant Mfg. Corp., Chicago, which produces a wide line of projection screens for both theatrical and amateur use. Radiant also distributes the recently introduced Gottschalk Super Panatar variable anamorphic lens. Mr. Herschman, who served as an aerial photography instructor during World War II, is a graduate of the University of Illinois.

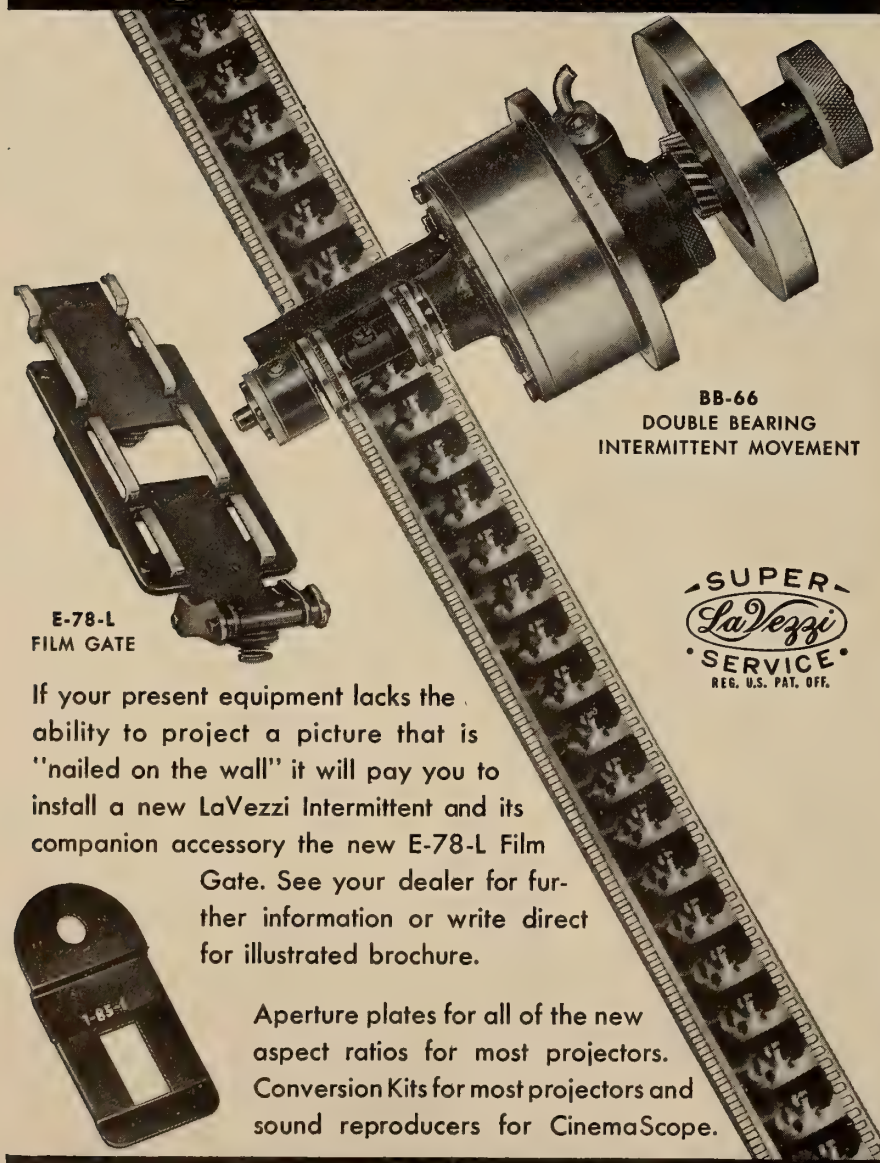


Harry S. Herschman, advertising manager for Radiant Mfg. Corp. of Chicago

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Fewer and Bigger Pictures Industry—Wide Trend

Hollywood may be making fewer pictures these days but those now being released are more likely to become box-office hits than at any other time in the history of the industry. This fact is established by estimates that at least 74 and possibly as many as 82 pictures will gross $2,000,000 or more in 1954. In 1949, for example, only 47 films earned that much.

This trend has been steadily developing despite anguished howls from owners of smaller neighborhood theatres who claim that this new approach to motion picture production—fewer but bigger pictures—is ruining them because there just aren't enough new films available to frequently change double-feature bills. It has been claimed that these neighborhood houses are patronized to a large extent by a hard core of habitual moviegoers who will attend frequently provided new pictures are being shown.

During this period of concentrating on better and fewer pictures, the producing companies have forgotten the old "B" picture which was the staple of these neighborhood houses. In general they are satisfied that the policy of concentrating on the big ones is going to pay off—at least for them and for the big-time exhibitor.

General Trend to Bigger, Better

20th Century-Fox, for instance, will have at least 14 and possibly more pictures in the $2,000,000 and over category this year; Metro will also have 14 and possibly as many as 17 pictures in this class, while Paramount expects to have about 13 pictures making over $2,000,000. Other studios have also produced a proportionate number of hits. It would appear that Hollywood executives have finally realized that better stories, better directed and produced, in combination with sensible use of the new technical processes, is the only way to compete with Tv. How much the small neighborhood house will be aided by this approach still is in doubt.

Test Your Electrical I.Q.

If you were required to pass an electrical licensing examination today, how well do you think you'd do? Starting this month, IP is presenting a group of questions asked at electrical licensing examinations given in New York City. Answer these questions yourself and then see how they compare with the answers given on page 32.

(1) What is a transformer and why is it used?

(2) Describe three ways in which A.C. current may be changed to D.C.

(3) How much current does a 110-volt, 500-watt lamp draw? What is the lamp's resistance?

(4) How would you recognize the series from the shunt-wound motor?

(5) What is a current transformer and what is it used for?

(6) (a) Why does the New York City Building Code require switchboards to be moisture-proof? (b) Why a space at the back of the board? (c) Why lamps, where protective resistance are necessary with automatic rheostats? (d) Why enclosed-type motor in dusty places?



Electrical Exam Answers

The electrical licensing examination questions asked on page 31 are answered herin:

(1) A transformer is a device by which the voltage of an alternating current system may be changed. It consists of an iron core surrounded by coils of insulated copper wire. Usually both core and coils are immersed in oil which serves as an insulator and helps cool the transformer. The voltage is changed in exact proportion to the number of turns connected in series in each winding. For instance, if the high-voltage winding has 1,000 turns and is connected to a 2200-volt circuit, a low-voltage winding of 100 turns will give 220 volts. Transformers are usually wound for single-phase circuits and in groups of three, used for three-phase transformation, although three-phase transformers can be built and are often used. In either kind of transformer, the high-voltage and low-voltage windings are completely insulated from each other.

(2) A.C. current may be changed to D.C. first, by means of a motor-generator; second, by means of a rotary convertor; third by means of a rectifier. In a motor-generator set, the generator is driven by an A.C. motor, and is connected on the same shaft with a D.C. motor. A rotary convector changes A.C. to D.C. by means of one armature having one winding. A.C. is fed in one side through slip rings and D.C. is delivered on the other side through a commutator and brushes.

(3) The current taken by the lamp may be obtained if you remember that

$$I = \frac{\text{watts}}{\text{volts}} = 500/110 = 4.545$$

The lamp's resistance:

$$R = \frac{\text{voltage}}{\text{current}} = \frac{110}{4.545} \text{ or } 24.2 \text{ ohms}$$

(4) To recognize the difference between series or shunt-wound motor, the internal connections of the motors could easily be followed out. Series motors would have one side of line to series field, other side of line to armature, and a shunt motor differs only in respect to shunt lead connecting field and armature together.

(5) A current transformer is a transformer used to connect measuring instruments which measure current or its function and for relays which depend upon the current value for their operation to the power mains. The primary is connected to the mains and the secondary to the instruments or relays.

(6) (a) As practically all current-carrying parts are insulated, with exception of the insulating material on which they are mounted or supported, and as moisture has a deteriorating effect on brass and copper, and also causes the current to leak across between points of opposite polarity, thereby making grounds and short circuits.

(b) So as to make the switchboard connections and devices accessible for workmen and provide a free circulation of air.

(c) The lamps when used in conjunction with automatic rheostats are arranged so as to absorb the inductive "kick" of the field coils when the motor is disconnected from the source of supply.

(d) To prevent dust, light or combustible material from lodging in places where it is apt to be ignited by sparking from the brushes or leakage of current.

*Questions and answers are presented through the courtesy of Theo. Audel & Co., publisher of Audel's Questions and Answers for Electricians Examinations.



RCA Theatre Service engineers are on the job with the type of sound service your theatre system needs. Optical or stereophonic sound ... there's no problem too tough for these experts who are backed by the vast technical resources of the Radio Corporation of America. Prompt, *dependable* RCA Theatre Service has played a top supporting role with exhibitors throughout the nation for more than 25 years!

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Futter Anent Lens Situation

Citing production schedules which list many VistaVision and other wide-screen film releases during the first half of the forthcoming new season, Walter Futter, distributor of Vidoscope projection lenses, urges the exhibition industry not to overlook the necessity for good wide-angle, short-focus lenses necessary for the proper presentation of pictures which have *height* as well as *width*.

This comment by Futter, a veteran film producer and distributor, would seem particularly apropos at present when the bulk of discussion anent projection technique is centered upon anamorphic-type lenses. The Futter declaration may not properly be charged to self-interest, since he distributes *both* the cylindrical anamorphic and standard projection objective lenses.

"Flat Field" is Pronounced

Vidoscope lenses are made in Germany by the world-famous house of Schneider and are distributed through theatre supply dealers in America with standard U. S. mountings and fittings. They come in steps of 1/5-inch at a speed of F:1.9 in a complete range of focal lengths. Designated as the Super Kiptar series, they constitute an interesting departure from the time-honored Petzval-type lens which has served the projection field so long and efficiently.

The usual aplanatic, or Petzval-type lens gives superior performance only inside a field of view not exceeding 10 or 15 degrees. The Super Kiptar, a double anastigmat lens, would seem to give a clear field of approximately three times as great, namely, 30 to 45 degrees. This wide field of view which gives a "flat" field is ideally suitable for wide-screen projection. The chief difference between the Super Kiptar and other widely-used double-anastigmats is that the front internal couplet of the former does not have cemented components.

Futter has just opened new and larger headquarters at 625 Madison Ave., New York 22, N. Y.

Non-Toxic Film Cleaner

A non-toxic film-cleaning solution that can be sold at a price comparable to the cost of conventional solutions has been marketed by Neumade Products Corp., 330 West 42nd St., New York.

Called "Renovex," the new solution can be used without the usual precautions regarding ventilation or exhaust equipment, since the fumes are harmless and is non-inflammable, the Neumade company stated. An important secondary feature of the solution is that it is said to render film anti-static so that the film will actually repel dust particles or lint rather than attract them.

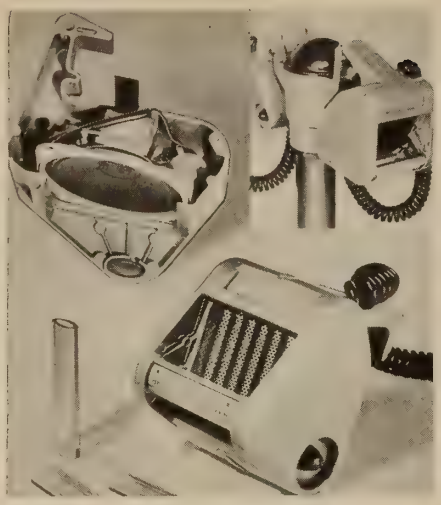


Simplex Drive-in Speaker Highly Shock-Resistant

The new Simplex drive-in speaker, now being marketed by National Theatre Supply, contains a number of design refinements to make it more resistant to rough treatment and easier for the theatre patron to use.

The unit includes a 4-inch Alnico-V aluminum voice coil speaker, spring-mounted into the two halves of the die-cast aluminum housing. This mounting method assures a floating suspension which reduces shock, minimizes magnet shifting and simplifies replacement.

The housing is finished in a durable silver hammertone enamel baked over a zinc chromate base, and has a two-step window bracket to aid in positioning. The handle is an oval-shaped plastic tube, providing space inside for a phorescent theatre name or slogan card which glows in the dark. The speaker is said to be weatherproof, and contains tamper-proof Phillips-Head screws throughout.



Three views of the new Simplex speaker for drive-in theatres.

Hi-Fi Show in New York

The largest assembly of high-fidelity enthusiasts ever to gather for a single event are expected to attend the 1954 Audio Fair, to be held for four days beginning October 14 at the Hotel New Yorker, New York City. A development of the last few years, the Fair is of interest to music lovers, hi-fi hobbyists and professional audio engineers. Interest in high-quality sound reproduction in the home has paralleled the development of new sound recording and reproduction processes in the motion picture theatre.

PERSPECTA SOUND OPERATIONAL DATA

(Continued from page 27)

"subsonic" band-pass filters is then rectified and smoothed out by capacitors and reactances. It is easy to see that these three D.C.'s vary in strength according to the amplitude of the 30-, 35-, and 40-cycle carrier tones in the soundtrack. Now, each D.C. is applied to the grid of a vacuum tube as a positive charge, or "bias." The positive bias on the grids of these three tubes will vary as does the strength of the carrier tones in the soundtrack vary.

The sound signal, or audible component, is conducted to the cathodes of the three "carrier-biased" vacuum tubes. Since a steady negative bias is also applied to these grids, the sound current can flow through the vacuum tubes *only when the positive "carrier bias" is strong enough to neutralize the constant negative bias.*

The intensity of the sound current

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flowing through any one of these three tubes from cathode to plate is therefore roughly proportional to the *amount* of carrier bias placed on the grid of that tube. And, as the amplitudes of the 30-, 35-, and 40-cycle tones are changing, the strength of the sound current flowing through the three tubes is always changing and varying.

Sound-to-Speaker Distribution

The sound-signal plate current from the tube controlled by the 30-cycle carrier is sent to the amplifier for the left-hand speaker. The plate current from the 35-cycle tube is sent to the center speaker, and that from the 40-cycle tube is sent to the right-hand speaker. In this way the sound output is divided between *any two or three* speakers, or directed to any *one* of them.

CinemaScope, employing *several* sound-tracks, can produce true stereophonic sound; but Perspecta, directing only *one* channel of sound to different speakers, cannot. If a soprano performs on one side of the screen while a guitarist accompanies her singing on the other side, it is clearly necessary to reproduce two separate sound signals simultaneously at different sides of the screen. Perspecta fails in this type of scene. The most it can do is compromise by channeling the *combined* sound to the center speaker — which is just the type of sound reproduction we started in with in 1928.

Quality Rating of Perspecta

In actual practice, however, Perspecta can seldom be distinguished from CinemaScope stereophonic sound. It has the advantage of a *permanent* optical sound record and standard film and soundhead specifications. Perspecta equipment is less expensive than CinemaScope, upkeep costs are very much lower, the prints cost no more than standard prints, the optical tracks can be reproduced monaurally without the need for special equipment, and the quality of the sound is consistently good.

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The quality of modern optical sound is at least as good as that of



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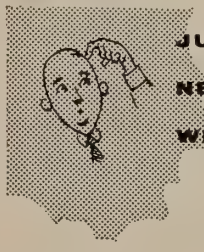
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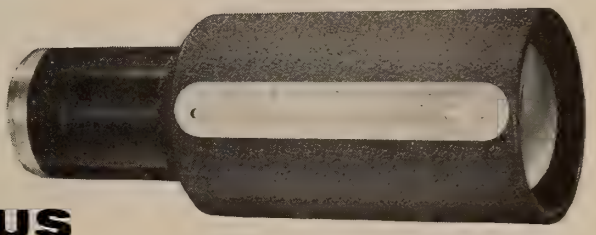
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3½″	2¾″ to 2″
4″	3¼″ to 2¼″
4½″	3½″ to 2½″
5″	4″ to 3″
5½″	4½″ to 3½″
6″	5″ to 3½″

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magnetic sound when the prints are new, and very much better after the latter have had considerable use. We foresee a slight amount of sound deterioration due to accidental intermodulation of the subsonic and audible signals, resulting in a low "gargle," but careful re-recording technique should eliminate this single possible source of danger to sound quality. At present, a maximum carrier amplitude of 16 decibels below a fully modulated soundtrack is employed.

Producer Confidence Evident

Perspecta has performed so satisfactorily in test runs in this country and in Loew's European theatres (where it is now being used for all M-G-M CinemaScope presentations), that it has now been adopted as the standard "stereophonic" process by Metro, Warners, Paramount (VistaVision)—in fact, by practically all producers except 20th-Fox. Perspecta has forced Fox to do something it swore it would never do—release its CinemaScopers in optional single-track versions.

Public Acceptance Held Assured

Public acceptance of Perspecta sound may be expected to follow the pattern of audience-reaction to CinemaScope sound. Directional sound, whether truly stereophonic or merely souped-up in the recording room, has never been a significant factor in movie attendance. With few exceptions, informed technicians feel that stereosound has been "tremendously overrated," that it "adds little, if anything, to the boxoffice value of a picture," and that 4th-channel reproduction of off-screen noises is "unnatural and distracting."

The chief value of Perspecta sound appears to be that it has restored the standard optical track to its rightful and well-deserved place as the only completely satisfactory medium of motion-picture sound accompaniment.

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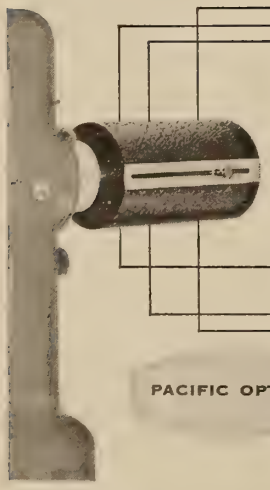
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PAST, PRESENT - AND FUTURE?

(Continued from page 23)

don't believe that even 5% of the theatres are actually projecting CinemaScope at 2.55/ or 2.66/1, for which it was originally designed. Every theatre I have been in is using somewhere between 2.25/ and 2.4/1. Many in the industry feel that it would be eminently more desirable to get an anamorphic screen image that more closely fitted 2./1, in order to obtain better grain concentration and overall superior definition.

Paramount is, to my knowledge, the only studio that is shooting in the VistaVision process (first up is "White Christmas," due for late November release), and Par is the only studio *not* shooting in CinemaScope. At M-G-M, every foot of CinemaScope film is also shot in the 1.75/1

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wide screen ratio in order to get the widest general release possible.

Anent anamorphic lenses, it seems that we are already collecting another group of "inventors." Considered more or less standard are the cylindrical jobs of Bausch & Lomb, Bell & Howell and Vidoscope; while on the *variable* anamorphic side there are the Tushinsky, the Gottschalk, and the Hilux, the last a recent entry by Projection Optics Co.—quite a wide range of choice.

Type of Soundtrack Now Elective

CinemaScope releases, fortuitously, are now available in 4-track magnetic, 3-track magnetic, 1-track magnetic, 1-track optical, and in the Perspecta system. The magnetic tracks utilize the penthouse reproducer; while the optical track is normal procedure. There is a very good description of the Perspecta system in INTERNATIONAL PROJECTIONIST for July (2nd section).

Simply expressed, Perspecta consists of an amplifier system and sound power supply system that directs 30-, 35-, and 40-cycle tones, which is superimposed upon the regular sound track below the level of audibility, to the respective horn positions desired in back of the screen.

The screens available today are beautiful. I never accepted those screens with seams. Our craft had advanced far enough that we did not have to ask the public to look at pictures either through horizontal or vertical venetian blinds. Two or three manufacturers have large seamless, one-piece screens, while one has a 90-foot, seamless, one-piece screen.

Now as to film damage, a subject very close to my heart. Film damage with the new equipment was very heavy, but is now tapering off. If your equipment does not damage film, you are sitting pretty; but if it is damaging film, get after your employer fast and strenuously.

Inform your employer that the industry is definitely ready to again start charging for mutilated prints! We receive every day damaged prints that are definitely the result of substandard or worn-out equipment.

I have tested four different types of film-coolers which will be marketed. Three of them are basically room coolers, converted into projection coolers. The fourth is a very simple double cooler that not only cools the heat filters on your lamps but also has an auxiliary one which goes into the projector. This does a very good job of knocking the temperature down at the aperture.

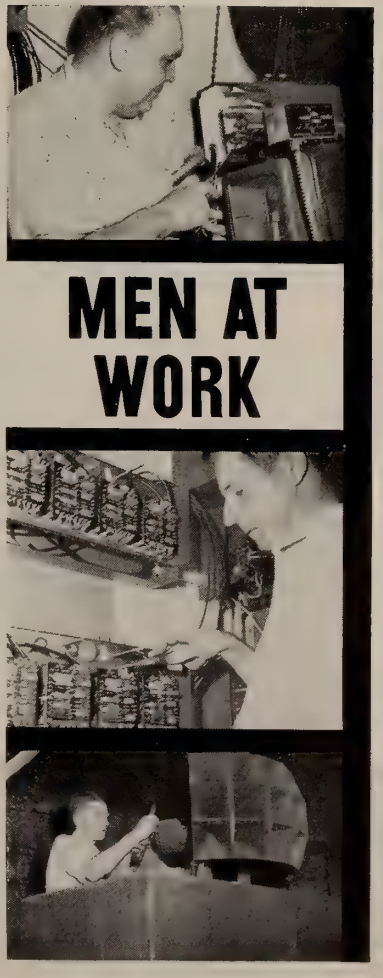
New Developments on the Fire

Several new developments are on the fire, among them the Todd-AO process in which "Oklahoma" is now being shot at M-G-M and on location in Arizona. The regular Todd-AO projectors, not yet available, are supposed to project both 65- and 35-mm film. Presently the daily rushes are being projected on Ernemanns converted for 70-mm operation. The steadiness and amount of light leave much to be desired, but this problem seems not to be insurmountable.

Fox has started experimenting with lenticular color. Black-and-white film is projected through filters to obtain a colored screen image—still very much in the experimental stage, in my opinion, despite the various announcements that have gone out.

Another item is a 3-track optical stereophonic sound, now the subject of experiment with a CinemaScope picture and 35-mm tracks. In other words, instead of the track being 100 mils wide as at present, it will be 150 mils wide. The adaptor used to reproduce this triple optical track is a very simple prismatic affair that is slipped into the present soundhead. Nothing definite on results as yet.

In closing, I believe that it behooves all of us projectionists to keep on our toes on all fronts. Very good sources of informative material are readily available in the form of our *IA Bulletin* and INTERNATIONAL PROJECTIONIST. Every delegate here should return to his respective Local Union and do everything possible to spread the gospel of keeping abreast of all technical developments.



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AN EVALUATION OF OPTICAL SOUND

(Continued from page 22)

these but also electrons from bombarded gas atoms, and electrons from the ion-bombarded cathode.

As soon as a positive gas ion hits the cathode, it gets its electrons back from the external source of "anode voltage." When this happens, the ion turns back into a neutral atom and wanders back into the free space of the cell—only to get hit again by electrons, whence the process is repeated.

Millions of electrons, gas atoms, and ions interact all the time that light shines on the photosensitive cathode. A process as complicated as this cannot be started and stopped instantly. So while a vacuum-type photocell responds perfectly even to billions of variations of light per second, the response-lag of gas-filled photocells results in a loss of sensitivity of about 25% when the intensity of illumination changes 10,000 times per second (as when a 10,000-cycle test film is run).

Voltage, Hook-up Requisites

Vacuum phototubes require a D. C. voltage (anode potential) of 250 volts or more, but gas-filled cells would be injured by so high a voltage. In practice, a potential of about 90 volts is applied to the terminals of modern, gas-filled phototubes of the types used in soundheads. Excessive voltage ionizes the gas to such an extent that the cell glows and a illumination of the photosensitive cathode. Violent bombardment of the cathode by the gas ions quickly ruins the cell.

In every case the positive terminal of the current supply must be connected to the anode wire of the cell, and the negative terminal to the photoemissive cathode. If the polarity be strong current passes even without reversed, the cell will not work at all. Fig. 4 shows how photocells are hooked up to amplifiers.

The photosensitivity of the caesium used as the cathode of modern photocells is increased by mixing it with certain substances which react chemically with it. In the conventional red-sensitive cells used in most soundheads, the caesium is mixed with silver and oxygen atoms; in the blue-sensitive cells intended for use with dye soundtracks, the caesium is alloyed with anitomy.

Europeans still make their photocells with the light-sensitive cathode materials coated directly on the inner surface of the glass envelope. American manufacturers coat the photoelectric substances on a metal plate, usually semi-cylindrical in shape. The American method results in greater mechanical stability with less chance of severance of the connection to the cathode.

[TO BE CONCLUDED]

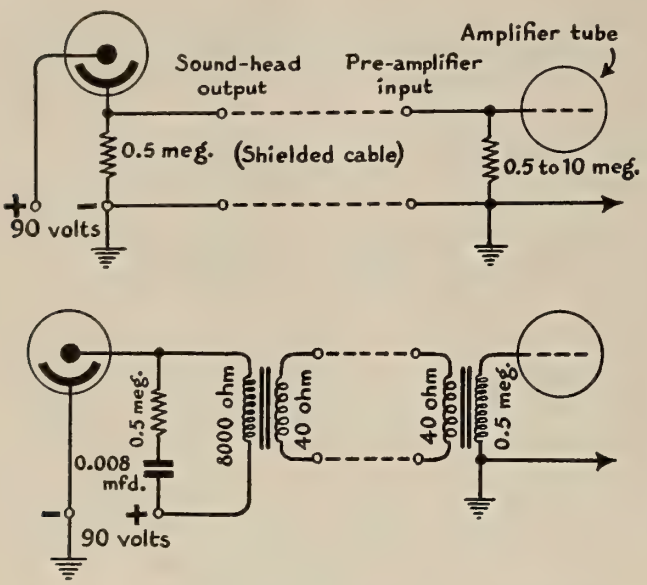


FIGURE 4

Top: resistance-coupled photocell circuit.

•

Bottom: transformer-coupled photocell circuit.

Triple-Header Trade Show

The continuing and widespread innovations being made in motion picture projection equipment have created much interest in the annual trade show of the Theatre Equipment & Supply Manufacturers Association scheduled to run from October 31 to November 4 at the Conrad Hilton Hotel in Chicago.

The TESMA show is held in conjunction with the annual conventions of the Theatre Owners of America and the Theatre Equipment Dealers Association. A large proportion of the exhibition space has already been reserved.

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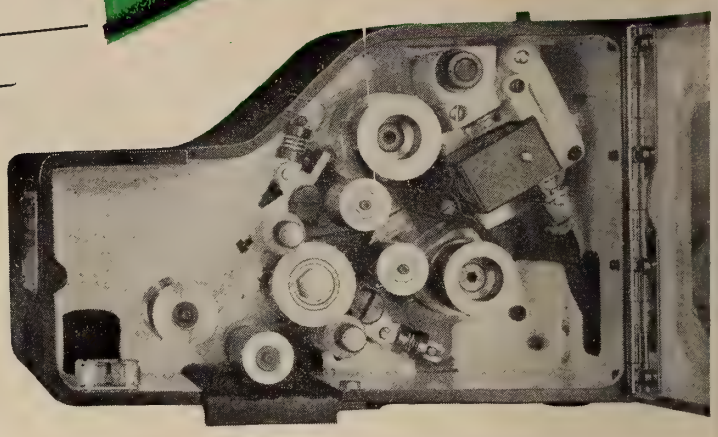
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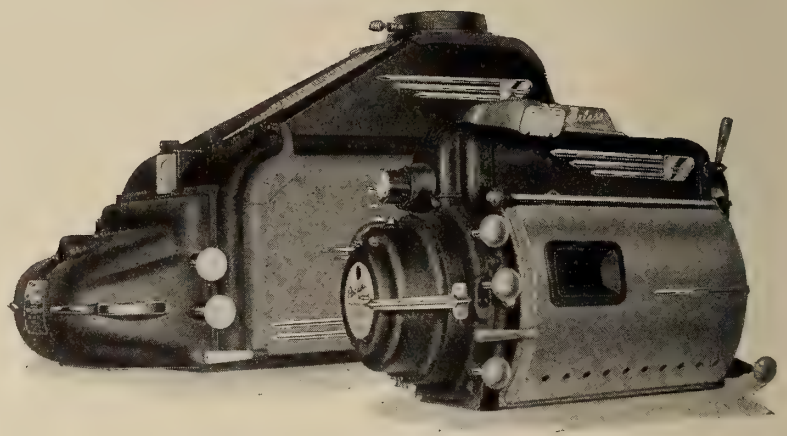
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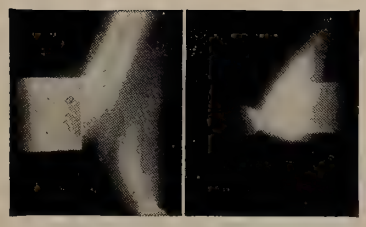


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MONTHLY CHAT

THE premiere showing of the VistaVision film "White Christmas" at the Radio City Music Hall in New York City utilized a novel unit of projection equipment — a mechanism which employs a turned projector head and thereby permits the horizontal projection of a film image equal in size to two of the presently standard projection film frames.

There is no question but that this projection technique represents a major advance in the art, as detailed elsewhere in this issue. However, in view of the wide publicity given this mechanism in the general industry trade press, IP stresses the point that this custom-made job was planned and executed for the specific Music Hall situation, which is widely recognized as the foremost exhibition auditorium in the world.

The present screen image of the Music Hall is 59 feet wide and is most impressive in terms of visual clarity and sharpness. Some two months ago, however, we witnessed the presentation of the very same film *via* standard vertical projection means which, to our mind, gave an equally satisfactory image. The issue being discussed here is whether under the present fluid state of technological developments we shall have to awake each morning only to be confronted by a new principle for the relatively simple process of projecting a motion picture. There is no question but that this new horizontal projection method has certain definite advantages; but it is a moot question whether a special installation of this sort is warranted for 95% of theatres on either a technical or economic basis.

If we continue to course the path of additional equipment and expense every time a producer of motion pictures has a new fancy, we can only anticipate economic disaster. We must remember, also, that at the present time there are two major efforts being expended to utilize 70-mm film which will employ the present standard vertical projection method. To our mind, there is little if any justification for applying Music Hall standards to the vast majority of smaller theatres throughout the world.

IP's view is that a proper regard for the economic welfare of the industry at large dictates that a considerable degree of caution be exercised at the moment — particularly in view of the lack of any agreement on standard procedure. Once a given process has proven itself, we may then move to utilize its advantages on a sound technical and economic basis.

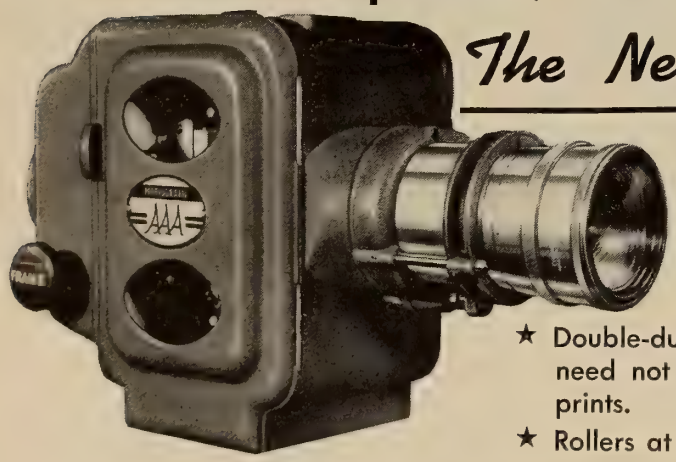
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★ Gears run on lubricated-for-life, double-row ball bearings. Smooth, silent, cool operation. Unbelievable resistance to wear.

★ Blower, available for use with high amperage arcs, cools aperture and film.

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Vol. 29, No. 10

October 1954

A summary of opinion which, while relating to a specific situation, applies with equal force to the fundamental requisites of the art of visual and sound projection. The appended expressions of various viewpoints reflect IP's policy of providing a forum for anybody who has anything interesting to say anent the projection process.

A Case In Point:

Top-Notch Projection Demands Top-Notch Equipment

To the Editor of IP:

Our efforts to increase our screen light embraced, among other things, the idea of using water-cooling for our lamphouse. Is is a fact that through the use of water-cooling jackets we will actually lose light? This seems to be a very controversial subject in projection circles, thus our appeal to IP for factual information. The basic problem is simple: how can we increase the light on our screen?

Our equipment set-up is as follows: a pair of Gardner heads with barrel-type shutters, with the shutters trimmed down to the point where we get a slight travel-ghost; Kollmorgen 4-inch, *f*/2 coated lenses; Strong Mogul lamps; metal reflectors; carbon trim of 8 x 9 Orotip Suprex, pulling 75-80 amps; RCA tube rectifiers for 40-volt, 80 amp, 3-phase; projection throw 250 feet.

Formerly our screen was 35 x 48 feet, surfaced with white asbestos siding (Johns-Manville). Now that we are converting for CinemaScope, we plan upon a screen 35 x 78 feet, with the same J-M siding. Light is our chief concern, as you will understand. Any assistance you are able to render will be greatly appreciated.

I think that you have a wonderful magazine. Other publications give me this "canned" information, but I have learned through the years to rely upon the integrity of IP.

JOHN "PAT" ELZEY

Pat Drive-In Theatre, Vidalia, Louisiana.

IP's Viewpoint:

IT IS our impression that the light on your present screen is somewhat less than you would like it to be. And, as you are aware, the light will drop to about half its present level when you change to CinemaScope—unless something is done to increase it.

The obvious and most effective remedy is, of course, the purchase of more powerful lamps together with appropriate rectifiers. This, as you say, is *out* for the present, so we'll see what can be done for a smaller outlay of cash.

First thing, we'll advise you not to spend money for something you don't need just now, and which will *decrease,* not *increase,* the brightness of your picture. We are talking about carbon-cooling water jackets. These devices improve the quality of the light, and they also make satisfactory operation of the lamps much easier; *but* they *always* decrease light-output by about 15% *unless the carbons are already overloaded.*

Carbon coolers increase light with an overloaded trim by preventing spindling, thus enabling a larger, somewhat shallower crater to be formed in the end of the overloaded positive carbon. This holds the luminous ball of ionized gas at the tip of the carbon and prevents it from streaming out as an oversize tail-flame. The tail-flame adds little or nothing to screen illumination.

Your 9-8 mm trim, however, seems to be a trifle *underloaded;* and the use of carbon coolers in your lamps *with your present rectifiers* will decrease your screen illumination by at least 15%, and possibly more. The water-cooled crater is slightly larger

than an uncooled crater, it is true, but crater brightness in the cooled carbon is approximately 30% under that of an uncooled carbon when the amperage remains the same.

Water-cooled carbons burn somewhat more slowly than uncooled carbons, and this means just one thing—less light at the *same* power-consumption. Charles A. Hahn of J. E. McAuley Mfg. Co., stressed this fact in the July 1953 issue of IP (page 21).

"As Simple as That"

In the case of carbon arcs," he wrote, "the main product we seek through their consumption is *light*, and its quality or volume is determined by the amount of carbon that is consumed. . . . All things being equal, we doubt if anybody can reduce the consumption-rate of a fuel and still come up with a gain in the output of the product you burn it for. It's as simple as that."

Purely fanciful claims won't increase your light. If your screen were smaller, and if you could feed 100 amps to your arcs, then carbon-coolers would be advantageous to you. Your lamphouses would be less hot, your screen would be more evenly lighted, and color changes would not be so apt to occur during changeovers. Under these conditions you would use carbon cooling. But under the actual existing conditions in your theatre, carbon coolers won't do you a bit of good, and, in fact, will rob you of light you can't afford to lose.

For comprehensive technical studies of the effects of water-cooling on arc operation, we refer you to *The Effect of Carbon Cooling on High Current Arcs by* Wolfgang Finkelnburg, Research and Development Laboratories, Fort Belvoir, Virginia (IP for June 1949, p. 14), and to *High-Brightness Carbon Arcs* by M. T. Jones and F. T. Bowditch, National Carbon Co. (IP for July 1949, p. 12).

Now let's take a look at your projection setup and see if anything can be changed to give you more light.

Your metal arclamp reflectors are doing your business as much harm as anything. This is something else you can get away with if you have plenty of light to begin with. The type of metal mirrors you are using are made of steel plated with rhodium, a shiny metal of the platinum family. These mirrors reflect only about 75% as much visible light as silvered glass mirrors, but just as much heat (infrared). So get glass mirrors for your lamps, and you will gain 25% more light. Two new mirrors will be sufficient, as you can save your metal mirrors for spares in case of breakage.

Optical Set-up Vital

When changing mirrors, don't fail to line up your lamps for maximum light production. The focal lengths of commercial mirrors often differ slightly, so if it's possible to readjust the mirror-to-aperture distance, try different distances until you get the brightest light. And, of course, all the optical components—mirror, carbons, aperture, and projection lens—must be in a *straight line* to get good light. Even a slight deviation can ruin your screen illumination.

The writer has often used metal mirrors, and while he appreciates mirrors that can't pit or break, he is not too happy about a 25% loss of light. The light from metal mirrors is yellower, or "softer," than that from silvered-glass mirrors, so you can expect color films to look better on your screen after you have made the change to glass mirrors. Protect your glass mirrors from sudden drafts and deposits of soot to insure against breakage. Sooty spots, which may be formed when the arc is struck too slowly, often crack mirrors because they absorb a great deal of heat.

Carbon Trim, Power Supply

You are burning the proper amperage in your lamps, but the voltage supplied by your rectifiers is a trifle too low for the best light. The rectifiers you are using are better suited to 8/7 mm trims. Your present 9/8 mm trim requires at least 45 volts to produce a crater of proper diameter and depth. You will probably find that the craters in your positive carbons are too small in diameter and too deep. Just as an experiment, you might try the smaller trim (8 mm positive with 7 mm negative, both copper-coated) just to see what happens to the light. Better still, change to rectifiers supplying 50 volts.

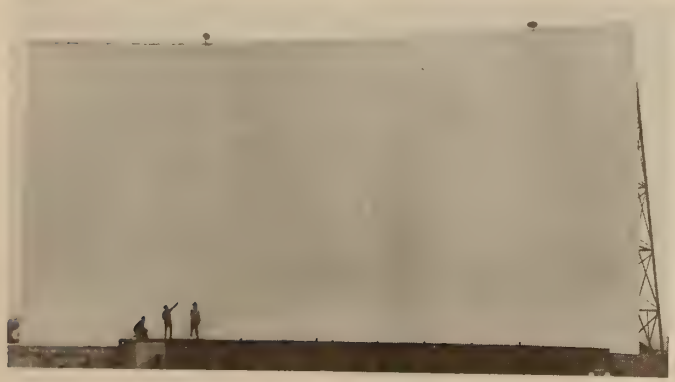
Travel-ghost isn't a good thing; and if you were getting plenty of light, you wouldn't want a trace of it in your pictures. But it would seem that you were justified in trimming your shutters a *little* beyond the limit to get every bit of light posible. Every lumen helps when the light is inadequate.

And this brings up the subject of your screen. The white asbestos siding with which your screen is surfaced has a reflective power of approximately 65%. A regular white movie screen reflects from 75% to 80% *even when perforated.* We realize that asbestos siding is a common screen surface in drive-ins, but by coating this siding with a weatherproof flat white paint of good quality the reflectivity can be stepped up to at least 80%, and may even go up to 90%. It is best to obtain a paint made for this purpose and, at any rate, paints containing white lead should be avoided. White lead turns yellowish in the course of time due to the formation of brownish-black lead sulfide.

Proper Screen Surface

It may be best to use such a white surface on your new CinemaScope screen. The use of an aluminized surface is ruled out if your projectors tilt upwards toward the screen. With an upward projection angle, an aluminum screen would merely throw most of the light into the sky where it would do no good.

It is unfortunate that no one has yet devised a weatherproof beaded



Screen used for the first CinemaScope drive-in presentation at the Motor Vu Drive-In Theatre, Salt Lake City. Enormity of screen, 102 by 48 feet, may be gauged by comparing its range with human figures shown at lower left.



What's a lily to a lady?

This particular lily may not "toil"—but it certainly does "spin" an important yarn for the processor.

Are the colors in balance? Are the flesh tints correct? How about gray scale values?

These together with many other questions, "the lily" answers quickly, authoritatively. For it is the test standard for tone values in release prints, a step wedge with color patches added.

In areas like this—how best to use various devices and tests, how to set up systems and controls, the Eastman Technical Service for Motion Picture Film is working with the industry—helping make today's motion picture production increasingly efficient—adding thus to the effectiveness of both black-and-white and color.

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surface for drive-in screens. Beaded screens are "specular," but unlike aluminized screens, they throw the light back in the same direction from which it came. The so-called Scotchlite surfacing used for making road-signs more visible when illuminated by auto headlights, has the same reflecting characteristics. Scotchlite screens would be ideal for drive-ins having a comparatively narrow viewing area.

To conclude, we believe that you can increase your screen illumination substantially by (1) using glass mirrors, (2) painting your screen with white paint made for drive-in screens, and (3) making a slight increase in your arc voltage, if this can be done. The use of an 8/7 mm carbon trim is an alternative which might possibly give a slight increase in screen light.

By CHARLES E. HAHN

J. E. McAULEY Mfg. Company

ANALYZING the projection situation at the Pat Drive-In Theatre, strange as it might seem, I believe that their present light source (if they eliminate their existing light losses) will result in sufficient light gain to give them a very well-illuminated CinemaScope picture of the size they intend to use—35 x 78 feet.

First of all, they are using a metal reflector, and this means an immediate loss of 20 to 25%. This reduced volume of reflected light is then projected through a barrel-type shutter which, in the writer's opinion, passes 38.7% of the already reduced total light. From the aperture, it passes through an *F*/2 projection lens, which at the focus he uses (4-inch) passes approximately 12 to 15% less light than would the same focus lens having a speed of *F*/1.8.

Now, let's see what all of these losses add up to. To begin with, the metal reflector-arc Mr. Elzey is now using would. if he had used a glass reflector, produce 15,000 screen lumens, according to the manufacturer's statements. The 20-to-25% loss that immediately takes place with the use of a metal reflector brings this total screen lumen count down to 11,625.

Now, since his barrel-type shutter passes only approximately 38.7% of this amount of light, he is now passing through the aperture only 4,500 lumens. Finally, because he is using an *F*/2 projection lens, accounting for another 12% loss, his total screen lumen figure is further reduced to 3,960. Thus, in his present set-up he is getting a loss of 11,040 lumens from a possible total of 15,000.

In changing to CinemaScope, the writer suggests that Mr. Elzey put in a new projector mechanism having an efficient revolving-shutter arrangement, an *F*/1.8 projection lens, and use a silvered reflector. He will then probably find that he has made a sufficient "for free" gain in illumination to produce a CinemaScope picture of the size he mentions. Possibly, this picture will be better illuminated than the level he is now obtaining with his present set-up and a 1.37/1 aspect ratio picture field.

By FRED C. MATTHEWS

Motiograph, Inc.

DRIVE-IN theatre owners who have increased the width of their screens to 100 feet or more should make immediate plans to whiten and resurface their present screens.

To best present CinemaScope productions and other wide-screen pictures, it is suggested that screens be increased in *both* height and width. For example, a present 30 x 40-foot screen should be increased in the proportion of 50 x 102-feet, if the theatre is to show a 2/1 image just as wide as a CinemaScope picture. If, however, it is wished to show only CinemaScope pictures to the full width of the screen, the height of the screen need not be increased in proportion mentioned above. The size of the screen and its proportion is a matter of individual taste.

Having arrived at the desired size and proportion of your screen, the next problem is to determine what is required in screen surfacing materials and finish. Most new screens have been resurfaced in "Transite" or plywood and finished with 3 coats of white paint similar to that made by Raytone Screen Co. There have been also a few screens refinished with an undercoat of aluminum paint and a second coat of white paint. The writer has seen screens finished with both types of paint, and screen results were quite satisfactory.

Some companies are offering both fibre glass and aluminum screen materials for resurfacing screens. Opinion on the respective merits of these materials is divided.

The change in the size of the picture will require a new set of projection lenses, and if pictures with varied aspect ratios are to be shown, more than one set will be required. It is recommended that fast anti-reflection coated lenses be purchased, as the use of cheap "slow" lenses could nullify some of the light gained from the use of higher-amperage arclamps. CinemaScope pictures require anamorphic lenses. There are at least 6 brands of such lenses available (fixed condenser-type and variable).

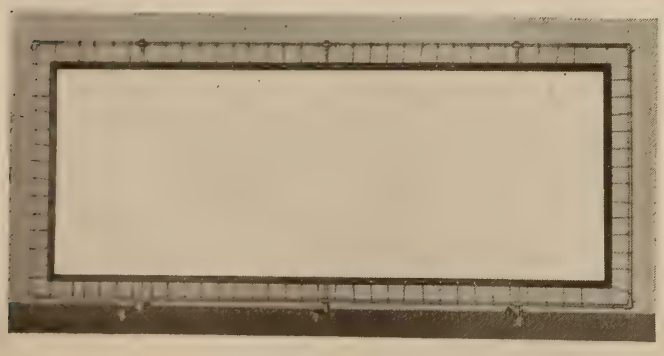
The most important item of equipment needed is new arclamps. Regardless of all claims of screen reflectivity, it is absolutely essential to have high-powered arclamps. There are only two types of arclamps that offer anywhere near sufficient screen illumination for screens in excess of 30 feet wide:

1. Reflector-type arclamps with rotating, positive-carbon mechanisms operating at 85 to 135 amperes.
2. Condenser-type arclamps operating at 160 to 180 amperes.

The reflector-type lamps, while vary-

(Continued on page 30)

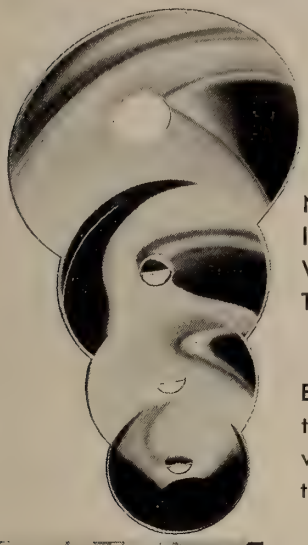
NEW RADIANT WIDE SCREEN FOR 16-MM PROJECTION AVAILABLE



Signalizing the positive entry of wide-screen images into the 16-mm field is this new semi-portable aluminum frame and screen for 16-mm projection recently developed by the Radiant Mfg. Co. of Chicago. It is available in two sizes — 6 x 16 and 8 x 21 feet

YOUR PICTURE BRILLIANCE

is in direct proportion to the efficiency of your mirror!



No arc can give you a bright picture if the mirror in your lamp has deteriorated in efficiency, for THE ONLY LIGHT WHICH CAN REACH YOUR SCREEN MUST BE REFLECTED BY THE MIRROR!

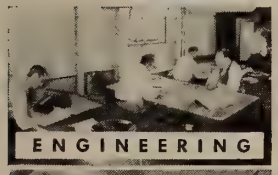
Endeavouring to make up light loss through the use of more current is pure waste, costs much more in power bills than periodic replacement of reflectors.

Strong Precision Reflectors, long recognized for their superiority, are carefully produced in types and sizes for use in all standard projection arc lamps. They are regularly stocked for immediate factory shipment.

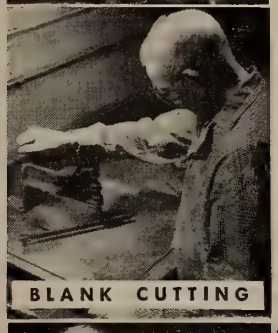
THE STRONG ELECTRIC CORP.

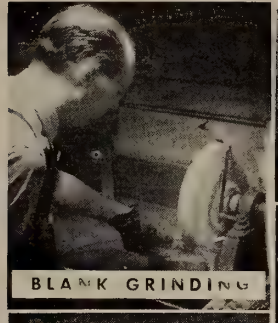
31 CITY PARK AVENUE

TOLEDO 2, OHIO

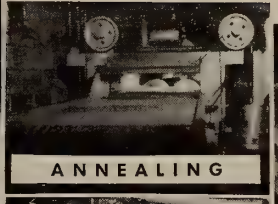

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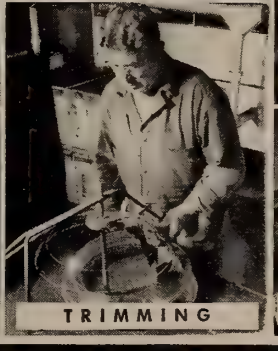

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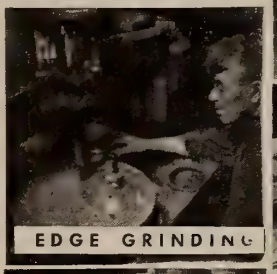

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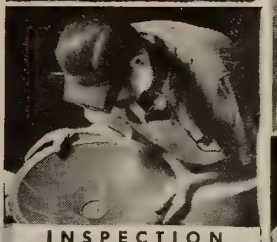

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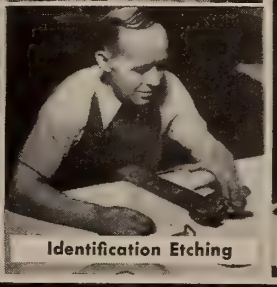

EDGE GRINDING


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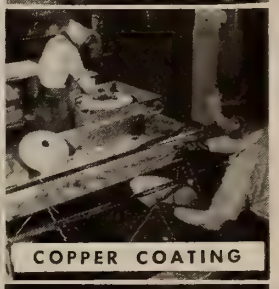

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INSPECTION

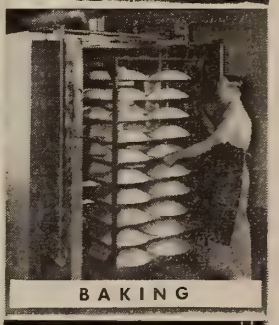

CLEANING


Identification Etching


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COPPER COATING


BACKING


BAKING


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PACKAGING

STRONG REFLECTORS

The New Kollmorgen F/1.7 Lens

By MARK STEVENS

BECAUSE OF THE well-established trend toward larger and wider screens, projectionists and exhibitors are devoting more attention to the projection lens than ever before. The demands made on the lens by wide-screen processes and drive-in projection are becoming increasingly severe. To meet today's exacting projection needs, Kollmorgen has designed a new *f*/1.7 Super Snaplite lens.

The advent of a lens as big, as "fast" as *f*/1.7 is indeed exciting news. The availability of this new ultra-speed lens in two forms that successfully overcome the optical difficulties previously experienced with extra-powerful lenses is an important advance in projection technology.

Projection lenses of *f*/1.7 speed are an indispensable ally of the newer, more efficient arclamps and of such resolution-improving photographic processes as Paramount's VistaVision. Lenses faster than *f*/1.7 are not feasible in the focal lengths most frequently used because of the mechanical restrictions of theatre projectors.

New lamps, alone, are not enough to provide adequate illumination on today's large screens. Even *f*/1.9 and *f*/2.0 lenses. although representing a tremendous improvement over the old-style uncoated "slow" lenses, do not utilize all of the light that passes through the aperture. Modern lamp mirrors are so fast (*f*/2.0 in the case of a 16-inch mirror 32 inches from the film plane) that the light emerging from the aperture "spreads out," or diverges, to such a degree that even an *f*/2.0 lens fails to intercept all of it.



The "regular" new Kollmorgen F:1.7 projection lens. Applicable data elsewhere in this issue.

Light Now Wasted

Contrary to general opinion, an *f*/2 projection lens *does not* "match" an *f*/2 mirror.* When the lens has an equivalent focal length (E.F.) of 3½ inches, it must have a "speed" of approximately *f*/1.2 in order to match *perfectly* the *f*/2, 16-inch mirror. Mechanical limitations prevent us from using a lens as big as this; but the new Kollmorgen *f*/1.7 lenses approach the theoretical matching speed so closely that they may be regarded as effectively establishing the desired condition of perfect optical match.

This statement is valid because the outermost zones of illumination which would be picked up by the rear element of a perfectly-matched lens are comparatively dim and discolored. In nearly every case, therefore, the new Kollmorgen *f*/1.7 lens utilizes and transmits to the screen practically the same amount of light that would be transmitted by a theoretically perfect lens.

Not only is light wasted when modern lamps are used in conjunction with old, "slow" lenses, but a "vignetting" occurs which results in a noticeable decrease of light at the sides of the screen. This hot-spot effect, caused by failure of a small-diameter lens to intercept the rays of light thrown forward from the marginal zones of the mirror, was first brought to the attention of the craft by Dr. Maulbetsch of the Kollmorgen organization.**

It is obvious that lenses of sufficient speed are absolutely necessary for bright, uniformly-illuminated pictures. But this is not all. The pictures on our new, wider screens are magnified more highly than ever before. And to make matters more difficult, the tiny film-photographs are smaller than ever before, their height having been reduced by the new apertures employed for non-anamorphic, wide-screen projection.

Emulsion-grain, poor photographic focus, and unsteadiness of the image are among the defects which are unfortunately magnified along with the desirable pictorial detail.

Finer-Grained Prints

Faulty photographic focus of the images in the film print is gradually being eliminated by greater care in photographing the negative and printing the positive. Graininess of the image, due to the comparatively coarse grain of the negative emulsion,



The X-tended new Kollmorgen F:1.7 lens. Applicable data elsewhere in this issue.

* The formula for lens matching is given on page 16 of IP for April 1954.

** "Uniform Screen Illumination as Related to High Speed Lenses," IP for September 1947, p. 5.

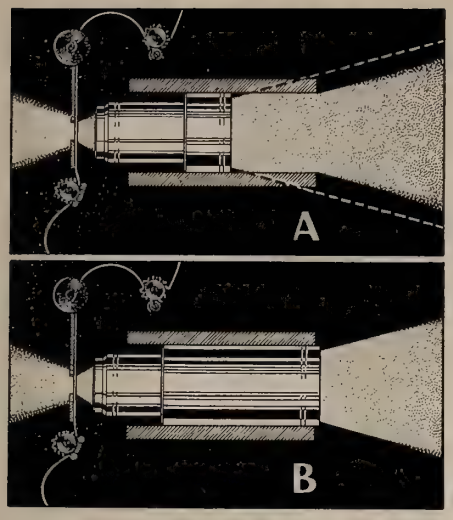


FIGURE 1
(A) The excessively long lens-holders of many modern projectors cut into the light beam thrown forward by "fast" lenses of short focal length, wasting light. (B) The new "extended" f/1.7X Super Snaplite lenses eliminate vignetting and loss of light due to shading. The secret—a long lens-assembly which "pipes" the light to the opening in the front of the mechanism.

is reduced by the VistaVision process, which employs a negative frame approximately 1.7 times the width of the standard 35-mm positive frame.

Picture at Mercy of Lens

The pictorial record impressed on the film, however, is at the mercy of the projection lens, the "neck of the bottle."

Many of the older lenses, even though of inadequate size and uncoated, produced screen images of an acceptable degree of clarity. This was often the case with lenses having long focal lengths — 4½ inches and longer — but in the shorter focal lengths the old-style lenses failed to give a satisfactorily sharp image near the edges of the picture (flatness of field).

The older lenses were of the type known as "Petzval aplanats," and consisted of two elements — 4 lenses arranged in the form of two achromatic doublets. Aplanatic projection lenses in improved form, and with the surfaces of the lenses anti-reflection-coated, still are made and give excellent performance in the longer focal lengths. The Snaplite Series II is a family of excellent aplanats of modern construction. These are rated as *f*/2.0 from 3½ to 5 inches E.F., and slightly slower in the longer focal lengths to 9 inches.

While wide-screen projection does not *necessarily* require the use of "wide-angle," short-focus lenses, it does in most cases. It all depends on what E.F. (equivalent focal length) is used for standard ¾-proportioned pictures. If, for example, 6-inch lenses were used for regular projection, the change to an aspect ratio of 1/1.85 will necessitate the use of 4½-inch lenses, the height of the picture remaining approximately the same. A 4½-inch lens is not a short-focus lens, a term usually applied to lenses of 3¾ inches E.F. or less.

Wide-Screen Requirements

In most theatres, however, conventional projection requires the use of lenses from 4 to 5 inches E.F. To change to wide-screen projection in such theatres, especially if the more extreme aspect ratios are desired, lenses of short focal length are needed.

Lenses are much too important a part of the projection installation to be selected haphazardly and without consideration of anything *except the focal length required.* As a matter of fact, a change of lenses provides an excellent opportunity to effect a substantial improvement in projection — in picture clarity, brightness, and uniformity of illumination.

Lens Coating Important

The optical design of the new lenses to be purchased, the presence of an adequate anti-reflection coating on all glass-to-air surfaces, and the speed of the lenses are factors which should be considered, together with quality and mechanical construction. The sharpness of the projected picture depends on optical design, the "crispness" and brightness of the images are assisted by the anti-reflection coatings, while picture brilliance and evenness of illumination are dependent on the speed, or diameter, of the lens.

Most modern lenses are 4-element (6-lens) "Gaussian doppelanastigmats," a type exemplified by the Super Snaplite families of *f*/1.9 lenses. These are highly recommended in the short and medium focal-length ranges, from 2 to 4½ inches E.F. Their superiority over the simpler aplanats lies in their wide, flat field which insures an extremely sharp picture over the entire surface of the screen.

The "hot-spot" effect of vignetting, due to insufficient lens diameter, is at a low level with *f*/1.9 lenses. But with the new *f*/1.7 Kollmorgen lens it is at an irreducible minimum! The use of the *very fastest* lenses — those of *f*/1.7 speed — is the easiest, least expensive way to inject a new brilliance and lifelike clarity into the screen image.

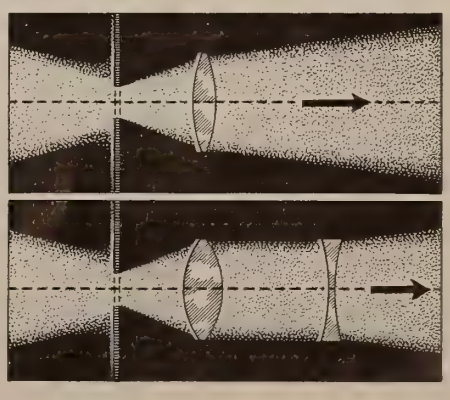
"Smoothing Effect" Noted

Because of their greater diameter and unusual optical design, these ultra-speed lenses not only make the picture brighter and clearer, but they also exert a "smoothing effect" on the light which results in a uniform field of brilliant illumination even on the largest screens. And the new *f*/1.7 Kollmorgen lens is available in focal lengths even as short as 2 inches!

The remarkable performance of the *f*/1.7 lens in the later projector mechanisms is not due to their high speed alone. For use in the older projectors having lens-holders extending about 6½ inches from the film-plane (Simplex Regular, Gardiner, Century K, Motiograph F and H, Wenzel, *etc.*) the BX-290 series of the *f*/1.7 lens is available. This series includes focal lengths from 2½ to 4 inches in ¼-inch steps. In optical design, these lenses are improved Gaussian doppel-anastigmats, larger in diameter and more light-transmitting than any other lenses available for theatre projection.

With most other projectors, including the Super Simplex, Simplex E-7 and X-L, Superior A and U, Brenkert BX-40, BX-60, and BX80, Century C and CC, DeVry, Motiograph K and AA, and the later Wenzel models, it is necessary, when ordinary short-focus lenses are used, to place

FIGURE 2
The action of a "regular" projection lens on the rays of light emerging from the aperture is shown in the upper diagram. A single convex lens is used to illustrate the principle involved. The action of an "extended" f/1.7X Super Snaplite is illustrated in the lower diagram by two simple lenses, an optical system resembling a Galilean telescope pointed toward the aperture. Note that the rays between the two components are essentially parallel, effectively "piping" the light through a long lens-holder.



Basis for High-Speed Optics

The larger picture area requires additional light. This being so, an f/1.7 lens, as compared with lenses of slower speed, is a distinct advantage, because it delivers to the screen an eye-filling 23% increase in light.

It is understood, of course, that unless the entire optical train from reflector or condenser set-up be in proper alignment, the advantages accruing from any fine optics will be dissipated. "High speed," optically speaking, is of no value whatsoever unless the other elements in the projection train (particularly the working-distance from either the reflector or the condenser combination) are in proper order.

Unless the entire optical train be in proper alignment, the best lens in the world will deliver unsatisfactory projection screen results.

"shade tubes" on the front of the lenses. The purpose of a shade tube is merely to extend the lens barrel sufficiently to meet the projector lens-holder which clamps the lens firmly in place.

Mechanical Limitations

The use of shade tubes on "fast" (large-diameter) short-focus lenses, although necessary to hold the lenses in place in these machines, creates a special difficulty, as does the relatively great distance between film-plane and the front of the mechanism. This distance is about 10½ inches in most modern projectors. Both the shade tube and the opening in the front of the mechanism actually cut into the light-beam issuing from the front element of the lens, reduce the illumination drastically, and produce a vignetting similar to that caused by too small a lens.

The obvious remedy consists of modifying the lens-holder and enlarging the hole in the front of the mechanism to accommodate lenses 4 inches in diameter, but this expedient is not always feasible. An alternative solution of the problem lies in a special lens design which "pipes" the light through the narrow opening, keeping the rays essentially parallel until they emerge from the front element of the long lens-assembly. This is what Kollmorgen optical designers have done in the 294X series of *f*/1.7 "extended" Snaplite in the focal range of 2 to 3 inches, inclusive, in ¼-inch steps.

The production of the ultra-fast *f*/1.7 *extended* Super Snaplite projection lenses ranks with VistaVision and the improved high-intensity arc as a contribution to projection quality. The replacement of outmoded short-focus lenses with *f*/1.7X Super Snaplites in modern projector mechanisms results in an improvement immediately apparent.

Immediate Improvement

The *f*/1.7 Super Snaplites, then, are ultra-rapid, high-quality projection lenses of relatively short focus available in two forms — the "regular" BX-290 short-barrel series for the older mechanisms, and the "extended" BX-294 long-barrel series for the newer mechanisms. Shade tubes are not needed for the "extended" lens.

Large screens are here to stay, no matter whether wide-screen aspect ratios are employed for extending the horizontal angle of vision, or whether the normal 1/1.375 aspect ratio is retained for a more spacious pictorial format. Either way, short-focus lenses are needed in most theatres to give the required size to the projected pictures.

The lens-holder and associated focusing carriage must be regarded as extremely important parts of the projector mechanism, despite the fact that their construction is quite simple. No lens can function properly unless

Lamp Manufacturer Assays Screen Surfaces

By CHARLES E. HAHN

J. E. McAuley Mfg. Co.

WE want to make it perfectly clear that we take no arbitrary stand on the question of the superiority of flat, curved, non-reflective or reflective surface screens. Nor do we agree that it is sound reasoning, especially from the exhibitor's viewpoint, to take a position that under all and every projection situation, only one particular type of screen is preferable to all others.

Unbiased Outlook Needed

When an unequivocal position of this kind is assumed, one would be justified to enquire to determine if there was not a special reason or motive behind it, because the motive might actually turn out to be something other than the claimed superiority of a picture projected upon that particular type of screen.

An attitude of universal and unquestioned acceptance of such counsel could enforce the purchase of new arclamps, rectifiers, or generator equipment, (with higher operating costs thereafter) which in dollars represents an investment far above and beyond that of simply installing a different type screen to obtain a picture of equal quality and possibly higher brilliance.

In analyzing a polar curve indicating the reflectance of a flat and/or matte white surface, it must be acknowledged that at least 75% of its reflected light actually reaches areas within a theatre where it is physically impossible to seat spectators, hence is totally wasted. We mean, of course, directly downward toward the floor, directly upward toward the ceiling, and directly sidewise away from both sides of the screen.

As this characteristic of flat, matte surfaces, is an established fact, doesn't it then seem completely illogical to categorically claim that such a screen is the only one that should be used in *all and every* type of projection situation? Further, doesn't this line of reasoning infer a defeatist attitude by creating the impression that nothing can be done about it, especially in the face of the endless variety of polar curves which it is possible to obtain from various types of reflective screen surfaces?

Many Types Available

To our knowledge, there are many very fine and distinctly different types of screens available today, and it is only a matter of selecting the right one to suit a given projection condition. We refuse to accept the hidden assumption that reputable manufacturers of these screens, and their sales agencies, would purposely recommend to an exhibitor a type of screen that would be totally unsuitable for the theatre in which it was to be installed.

it is held solidly and square to the aperture, the optical axis of the lens coinciding with that of the mechanism and lamp. And what better time is there to check up on the condition of the lens-holder and focusing arrangement than when changing to new lenses?

Watch Optical-Train Alignment

The lens-holding components of the older mechanisms, especially if rebuilt or modified to take larger lenses, may be seriously out of alignment, ruining the performance of sensitive, fast lenses. The use of cardboard or odd scraps of sheet metal to shim the lens-barrel in off-size holders may throw the lens out of line, making it impossible to get a good focus. The "haywire" shims should be replaced with adapters or other fittings recommended by the manufacturer of the lens.

The faster a lens and the shorter its focal length, the smaller its "depth of focus." This means that the focusing of the picture on the screen is a more critical operation than it was in the days of slow, long-focus lenses. Then, too, focusing is always more critical with lenses of the best quality and requires more exacting projection technique. Poor lenses fail to bring the projected image to knife-edge sharpness, and the best focus obtainable with them is fuzzy at best. Such a lens may be moved through a considerable distance without any perceptible change in the clearness of the image.

The new series of Kollmorgen *f*/1.7 Super Snaplites (the "regular" for older mechanisms and the "extended" for the Super Simplex and most later machines) gives so much evenly distributed light at the screen, as well as a flatter field of crystal-clear definition, that a thorough checkup of the projectors and the installation of heat filters when necessary will insure screen results unsurpassed for radiant, lifelike quality.

Par's Electronics Splurge

Paramount as of Jan. 2 this year had investments in and advances to affiliates engaged in research and development of Tv and electronic facilities and equipment amounting to $4,223,250. The investment in 560,000 shares of Allen B. Du Mont Laboratories Class B and 43,200 shares of Class A common, is carried at $164,000.

This Matter of "Balanced Lenses"

Word comes from Berlin that Eric Palmer, noted cinematographer and director, has completed a feature picture using the Garutso lens. This news occasioned some eyebrow-lifting in technological circles with many observers being at a loss to classify properly the Garutso lens. To clear the atmosphere, IP appends hereto a report on this process which it published some years ago when the principle was first proposed.

GARUTSO "balanced lenses," credited by their sponsor with the ability to impart depth to photographic images, have received widespread and, on the whole, rather glowing sendoffs from the photographic trade press. The virtues of these patented lenses are described in the appended verbatim copy of a statement by their sponsor:

"A commercial set of Garutso lenses is comprised of 25, 30, 35, 40, 50 and 75-mm focal lengths. Inherent to all of them are unusual characteristics that set them far apart from conventional lenses of similar focal lengths.

"Variable Deep Field of Focus"

"First, instead of a *single plane* of focus, Garutso lenses have a variable and tremendously deep *field* of focus. This depth of field results from Mr. Garutso's discovery of new principles and is in no wise produced by special diaphragm apertures or tricks of any kind. The variability of the field is controlled by focus adjustment entirely.

"A number of different Garutso lens formulae have been developed for the modification of conventional photographic objectives of different types and focal lengths. While these formulae differ among themselves, they all embody the same optical-balance principles.

Assert Two Major Improvements

"In general, the Garutso modification accomplishes two major improvements: (1) the focal depth of the modified objective is increased, and (2) the definition and contrast of the image is greatly enhanced by a substantial reduction in the vestigial spherical aberration of the conventional lens. Previous attempts to accomplish the increase in depth of focus, first above-mentioned, have had no success because the modifying elements used have introduced other undesirable aberrations.

"The diaphragm, instead of being used to create an illusion of increased focal depth by means of small apertures as in a conventional lens, is employed in the Garutso lens to increase the plasticity of the photograph, thereby intensifying the three-dimensional effect. The Garutso balanced lens provides a negative of uniform density throughout the entire field at all apertures."

Following careful consideration of the foregoing, as well as of other data relating to the Garutso lens, IP is constrained to make the following observations:

Optical Limitations

For a given sharpness of image at a given focal length of the lens and a given aperture, *all* lenses have and *always will have* a given depth of focus.

There are three methods by which one may achieve depth of focus: (1) reduce the focal length of the lens; (2) diminish the size of the aperture, or (3) reduce the sharpness of the image. This last-named condition would seem to be a major function of the Garutso lens, with results that were strikingly apparent in the motion picture "Citizen Kane," produced by Orson Welles many years ago (1938).

The foregoing is as much a natural law as is the fact that if one stepped out of a ten-story window the chances would be excellent that one would break his neck. We need not confuse this issue with considerations of aperture opening, lens speed, or the amount of light on a given set. These fundamental laws prevail and are at once controlling and incontrovertible. —even in Hollywood.

It is an astonishing thing that nobody in Hollywood has yet lent acceptance to the principle that we shall reduce the sharpness of the *foreground* images.

New DuMont Tv Color Tubes

DuMont has announced that large screen, color Tv receiver tubes will be available for use by the Fall of the year. The tubes will produce a picture 185 square inches, according to DuMont, which would make them roughly equivalent to a 16-inch tube in picture size.

The VistaVision Horizontal Projector

To improve VistaVision screen image in large theatres and drive-ins, Paramount and Century design equipment to project film image more than twice standard size.

By JAMES MORRIS

THE LATEST of the new processes is a projection method designed to pull motion picture film from side to side so that a film image equal in size to more than two standard film frames can be utilized. Designed to complement Paramount's VistaVision camera system, this new projector has been installed in New York's Radio City Music Hall where it is being used to present the picture "White Christmas."

Right at the start, however, it should be stated that the new projector, which is to be manufactured by Century Projector Corp., is not designed to fill the needs of all theatres. According to Paramount, only 100 indoor theatres in the United States are large enough to make profitable use of the new projector — and these have screens over 50 feet wide. In addition, horizontal projection may also become important to the larger drive-in theatres.

Aperture Much Enlarged

The way the VistaVision horizontal projector works is shown in the accompanying illustrations. The projector head designed by Century is layed on its side so that the film is pulled horizontally instead of down, and a film area eight sprocket holes in length instead of four is pulled with each movement of the film. Film speed is 180 feet per minute, and 4000-foot reels are used.

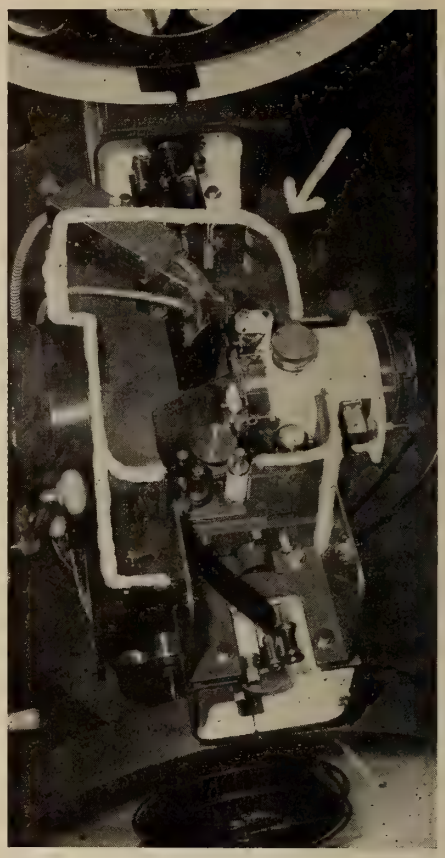
A special projector gate with an enlarged opening and a much larger aperture plate made it possible to project a film image of 1.418 by .722 at the Music Hall instead of the conventional aperture of .600 by .825. The result is a sharper and brighter screen image, since the magnification of the image on the screen is less than half as much and more light is able to reach screen.

The VistaVision horizontal projector was developed in order to more fully utilize the potentialities of the VistaVision camera process developed by Paramount. This camera process also involves pulling the film sideways through the camera and exposing a negative roughly equivalent in size and position to that of the familiar 35-mm miniature still camera. This larger negative is then reduced in size and placed in the standard position on 35-mm film stock by an optical printer. That's the standard VistaVision process which will continue to be used in making the VistaVision prints for most theatres.

Since the graininess of the negative had been the principal barrier to achieving sharper motion picture prints for large-screen projection, it is possible to get a sharper print by using the VistaVision camera and large negative. Negative films have to be faster (more sensitive to light) than the positive print films which are exposed only under the highly controlled conditions of the film laboratory. The slower but more fine-grained positive print film used in the laboratory is capable of retaining most of the sharpness of the large negative even when the film image is reduced in size to fit the standard projection aperture.

Not Enough Light

There is an important objection, however, to the use of this standard VistaVision print in some theatres. When projected with the further reduced aperture used in wide-screen projection, the resulting screen image retains considerable sharpness, but it is not bright enough to give really first-class results on a giant screen. Also, less magnification of the film image would further sharpen the giant-screen picture.



Showing the horizontal projector in use at the Radio City Music Hall. The white arrow points to the projector head outlined in white. The head is repositioned so as to lie on its side. Note that the magazines are in a vertical position but not directly above and below the projector as in standard models.

Sharp Image Obtained

For this reason Paramount resorted to the idea of making contact (same size) prints from the big VistaVision negative and projecting them in the same way that the picture was taken —by pulling the film from side to side. In addition to producing an extremely sharp screen image, this method permits considerably more light to reach the screen.

Those who witnessed the Music Hall showing — the first time since the early thirties that a much enlarged film image was used to improve theatre projection — were much impressed by the results. On a screen approximately 60 feet wide and 32 feet high, the Music Hall projectors placed a sharp, bright image that was considerably better overall than what could be achieved by using a conventional

film image which is less than one-half as large.

Sharpness Greatly Increased

The clarity of the picture presented at the Music Hall was extremely good, but it also had some questionable characteristics due, most probably, to the fact that the projectors used were really experimental hand-tooled models put together in a very short time to meet the deadline for the opening of "White Christmas" which is, incidentally, the first picture made in the VistaVision process. There was a sidewise "jiggle" or unsteadiness on the morning of the opening that was particularly noticeable in the titles. Also, the screen did not seem as brightly lighted as one might expect since it was predicted that the enlarged aperture would permit the passage of as much as 100% more light.

The unsteadiness of the picture seemed to pass later in the showing. Loren Ryder, technical head of Paramount, who was present, said that the condition was corrected by an adjustment of the gate tension and the intermittent. The brightness of the picture was less than one might expect, it was said, because technicians at the Music Hall had deliberately reduced the light because they felt that the color balance of the arclight resulted in the best rendition of color on the screen at about 150 amperes. It was also felt that the picture was too bright when 170 amperes of current was used to project the larger film on the screen used at the Music Hall. Since the first showing the amperage has been stepped up somewhat.

There is no doubt, however, that enlarging the film-image area is the most logical method of improving the quality of giant-screen pictures. According to Larry Davee, sales manager and engineer for the Century Projector Corp., the two hand-tooled projectors used in the Music Hall were designed and built within 2½ weeks to meet the deadline. There just wasn't time for perfect results.

In constructing the projector a number of mechanical problems came up. One involved the intermittent mechanism which could not stand the strain imposed by a heavy 32-tooth sprocket at a film speed of 180 feet per minute. A new star cam and sprocket had to be engineered before the projector could be relied on to stand up under operating conditions.

Big Reels a Problem

Another problem concerned the 4000-foot reels used in this high-speed horizontal projection. Ordinary take-up reels tended to develop so much momentum at this speed that they snapped the film. The requirement was for a free wheeling reel in perfect condition. The problem was resolved by designing a type of free-wheeling reel in which the movement of the flanges was completely free of the movement of the hub.

Davee went on to say that the faster film speed of horizontal projection would be a boon to sound reproduction, suggesting that an optical track running at this speed was capable of attaining a response of 16,000 cycles per second. There was no doubt in his mind that such a fast-traveling optical track was superior to present-day optical and magnetic sound-on-film methods, and capable of providing a wider sound range response than any presently available theater reproduction equipment is capable of responding to. For the Music Hall showing sound was on a separate film and run through a separate synchronized projector at 90 feet per minute.

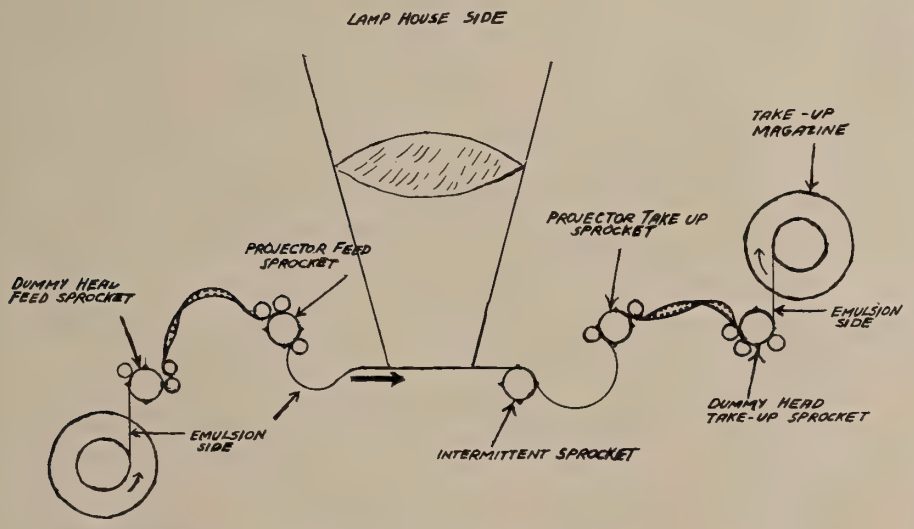
For some reason the Paramount people who have publicized the horizontal projector have not stressed its value as a means of increasing light at drive-in theatres. It was primarily in response to questions by reporters that Loren Ryder discussed the question after the opening. However, he stated that he felt it would be possible for a drive-in to increase its light as much as 100% by means of the new projection system. Larry Davee was not quite as optimistic when interviewed by IP. He estimated that the new system might be capable of increasing light transmission by about 40% using present arclamp equipment. With specially designed arclamps an improvement as great as 100% should certainly be possible.

Film Buckle Increases

The crucial question concerning the design of projection systems using a larger film image and a more powerful light source is the problem of film buckle, according to Ryder. He states that the amount of buckle increases with the square of the width of the film. For instance: a 70-mm film would be likely to buckle four times as much as 35-mm film—not twice as much. This characteristic tends to counteract the benefits obtained by spreading the light over a wider film area.

Ryder and Davee both state that

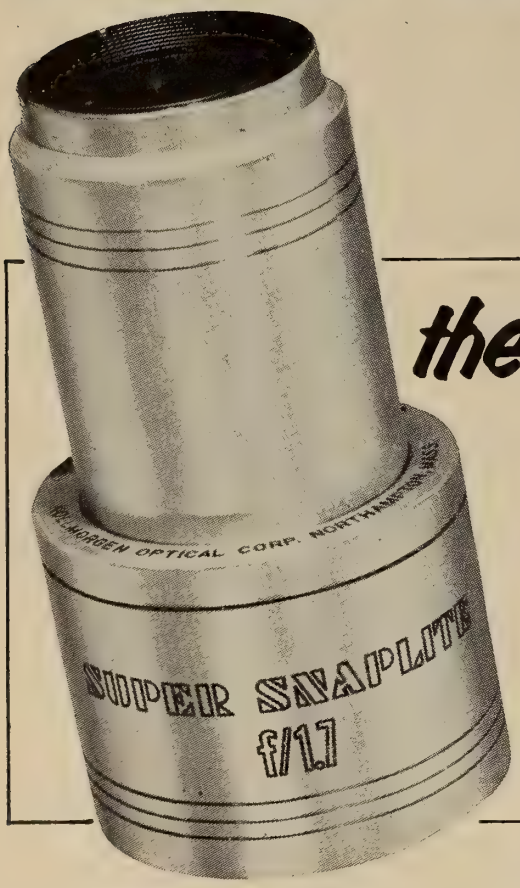
(Continued on page 27



—FILM THREADING INSTRUCTION— OF 'CENTURY' VISTA VISION PROJECTOR

Here is the drawing which provided the guide for the Music Hall projectionists for threading the VistaVision horizontal projector. IMPORTANT: on the actual projector the feed and takeup magazines and the extra sprockets (32-Tooth) are positioned differently. The film magazines are positioned vertically as in a standard projector but they are offset to the side. The extra feed and take-up sprockets redirect the path of the film. The points at which the film twists are shown. The soundtrack for the Music Hall showing was carried on a separate film which was run on a standard 35-mm vertical-pull projector interlocked with the VistaVision horizontal-run projector. This is a temporary expedient.

ANNOUNCING TWO GREAT NEW LENSES



the SUPER SNAPLITE F/1.7

and SUPER SNAPLITE F/1.7X

Now Finer Lenses for Finer Motion Pictures with a True Speed of f/1.7 in all sizes where fast lenses are needed.

From Kollmorgen...the newest, fastest projection lenses you can buy. To give you the brightest, clearest, sharpest, most uniform picture you have ever seen on your screen. For better Boxoffice, better patron satisfaction, better all around filming, try the new SUPER SNAPLITE f/1.7 today. When vignetting is a problem investigate the SUPER SNAPLITE f/1.7X.

True speed of f/1.7 in focal lengths from 2 inches through 4 inches in ¼ inch steps. Ask your Theatre Supply Dealer about these fine lenses. For more information ask your dealer or write for Bulletin 222.

BOOTH 95
1954 TESMA SHOW

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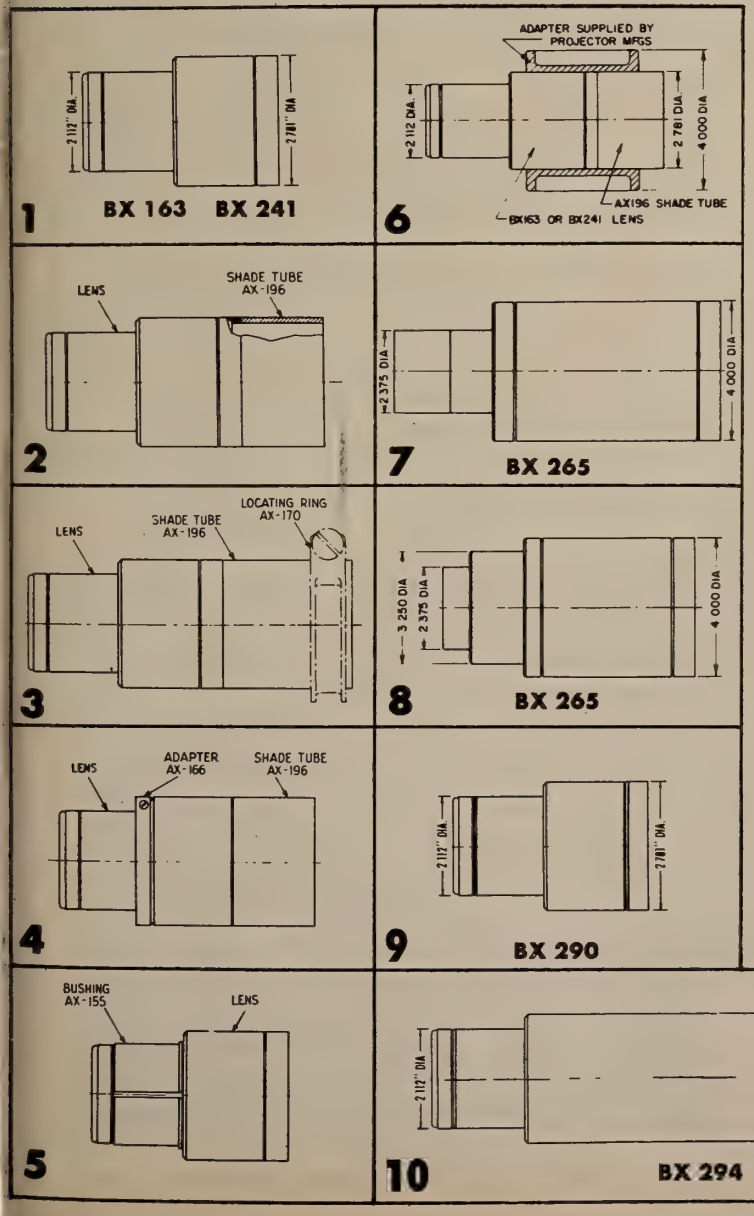
ORDERING DATA FOR THE KOLLMORGEN F:1.7 LENS

The new Kollmorgen F/1.7 lens is adaptable to *any* make or model of projector. The *regular* is for use with projectors having a 4-inch diaphragm opening; the F/1.7X (extended) may be used on *any* type of projector. Reference to the chart at the right will provide an accurate guide for the use of this new high-speed lens. When ordering from your supply dealer please specify:

1. **Lens-fitting numbers as given in the table at the right.**
2. **Make and model of projectors.**

***IMPORTANT:* The F/1.7 *regular* lens is available in sizes from 2½ to 4 inches inclusive in ¼-inch focal length steps. The F/1.7X (extended) is available in sizes from 2 to 3 inches in ¼-inch steps.**

BE SURE TO SPECIFY THE FOCAL LENGTH



PROJECTOR		SUPER SNAPLITE f/1.9 (BX241) SUPER SNAPLITE f/1.7 (BX290) SNAPLITE SERIES II (BX163) STANDARD BARREL			
Make	Model	Fittings	Fig. No.	Notes	Recommended f/1.7 Lens Number
Ballantyne	"W"	None			290
Ballantyne	"W" Large lens mount	AX-155	5		290
Ballantyne	"G" (Gardiner with reg. lens mount)	None			290
Ballantyne	"G" (Gardiner with large lens mount)	AX-155	5		290
Ballantyne	4" dia. mount	AX-196	6		290
Brenkert	BX-40, BX-80 BX-60, BX-62	AX-196 AX-170*	3		294
Brenkert	RCA 100	AX-196	6		290
Century	C, CC, K Super	AX-196 AX-166	4		290
Century	C, CC, K Super (Using 2 clamp rings)	AX-196 AX-166	4		294
Century	K (or Kaplan)	None	1		290
Century	K with C-62 modification	AX-155	5		290
Century	4" dia. mount	AX-196	6		290
Holmes	Type 8, Educator	AX-196	2	Will take lenses 5" E.F. and longer only	290
Holmes	Type G.P.	AX-196	2		290
Holmes	Type D	AX-196	2	Will take lenses 5" E.F. and longer only	290
International Projector Corp.	Simplex E-7	AX-196 AX-170*	3		294
International Projector Corp.	Simplex, Regular	None †	1		290
International Projector Corp.	Simplex, with C-62 modifications	AX-155	5		290
International Projector Corp.	Simplex International	None	1	Will take lenses 4" E.F. and longer only	290
International Projector Corp.	Simplex Semi-professional	AX-196 AX-170*	3	Will take lenses 4" E.F. and longer only	294
International Projector Corp.	Super Simplex	AX-196 AX-170*	3		294
International Projector Corp.	XL	AX-196	6		290
Motiograph	AA	AX-196	2		294
Motiograph	F	None	1		290
Motiograph	HU, HK, K Deluxe	AX-155	5		290
Motiograph	4" dia. mount	AX-196	6		290
Powers		AX-196	2	Will take lenses 5" E.F. and longer only	290
Powers	With heavy duty focusing front	AX-196	2	Will take lenses 5" E.F. and longer only	294
Wenzel	Pro-4, Pro-6	None †	1		290
Wenzel	Pro-4 with large lens mount	AX-155	5		290
Wenzel	4" dia. mount	AX-196	6		290

* Not regularly furnished, but can be supplied if desired.

† .0065" shims furnished at no cost when this projector is specified.

PROJECTOR		SUPER SNAPLITE (BX265) 4" Diameter Barrel		
Make	Model	Fig. No.	Note	Recommended f/1.7 Lens Number
Ballantyne	4" dia. mount	8	Shade — Tube AX-196 required if BX-163, BX-290 or BX-241 lenses are used. See Fig. No. 6	290
Brenkert	RCA 100	8		290
Century	4" dia. mount	7		290
International	XL	7		290
Motiograph	4" dia. mount	8		290
Wenzel	4" dia. mount	8		290

In The SPOTLIGHT

The function of this department is to provide a forum for the exchange of news and views relative to individual and group activities by members of the organized projectionist craft and its affiliates. Contributions relative to technical and social phases of craft activity are invited.

AFTER a year of negotiation, labor-management recently announced agreement on an industry pension plan covering 18,000 studio workers on the West Coast. This plan, involving 40 unions and guilds and 200 employers, becomes effective the 24th of this month. The agreement specifically includes member companies of the Ass'n of Motion Picture Producers, Society of Independent Motion Picture Producers, Independent Motion Picture Producers Ass'n, and the Alliance of Television Film Producers.

Payments to this pension fund will be made by both labor and management, each contributing two cents for every "straight time" hour worked. However, employer contributions are retroactive to October 26, 1953, when negotiations first began, while employee contributions will start October 24, 1954.

In order to allow sufficient time in which to build up an adequate fund, the first possible pension payment of $20 per month will be January 1, 1960. A worker eligible for a pension must be 65 years old and have worked a minimum of 20,000 hours and 20 "qualified" years in the industry. A "qualified" year is one in which the employee has worked at least 400 straight-time hours.

Employees eligible for individual company retirement plans at Loew's, 20th Century-Fox, and RKO may choose between the company and industry pensions, but they cannot participate in both.

A board of 16 directors, equally divided between labor and management, will administer the plan. George J. Flaherty, IA West Coast representative and business representative for Hollywood Projectionist Local 165, was appointed chairman of the first board. Other IA board members are James D. Tante, Local 728; Herbert Aller, Local 659; Alan Jackson, Local 633; John Lehners, Local 727. Representing AF of L unions other thanæ IA are board members Ralph H. Clare, Henry C. Wadsworth, and Norman Lowenstein.

● Charles Vonesh, member of Chicago Local 110, has been appointed head of the Motiograph field service department. He succeeds J. W. Huckleberry of Local 281, Paducah, Ky., who has joined Motiograph's engineering department.

● The recent SMPTE convention contained so very little practical projection material and so very much of the other arts — notably Tv, color, radio — that the importance of IA technicians keeping abreast of technical developments must be emphasized anew (see the article by Merle Chamberlain — "Past, Present — and Future?" in last month's IP).

● Benefits paid by national and international unions affiliated with the AF of L for the year 1953 totaled $107,346,178.79, according to the report issued by the Federation's executive council at the recent 73rd convention.

● Clifford Vericker, member of Detroit Local 199, was installed as commander of the Russell Johnson Theatrical Post No. 371 of the American Legion. This post meets at midnight the first Tuesday of each month.

● Speaking of Rochester Local 287, two of its members, Thomas Moore and Raymond Hansen, were injured while installing a wide screen at the State Theatre in Aliquippa, Penna. Moore lost his balance and fell from the top of the scarffold, sustaining six broken ribs, a broken pelvis bone, and a fractured spine. He will be hospitalized for at least five months. Hansen was injured when one of the falling speakers hit his foot and inflicted severe bruises.

● *Recent out-of-town visitors to the offices of IP:* Bob Milligen, member of Toronto Local 173, and his attractive wife, visited with us for a while and we cut up a few touches discussing friends. From Detroit came George Hickox who was driving up to Canada for a short vacation. Although Hickox is a member of Local 291, Grand Rapids, Mich., he has been working out of Local 199 jurisdiction for a number of years. Another vis-

TORONTO LOCAL 173 FOURSOME WINS COVETED GOLF TROPHY



The highly-prized N. A. Taylor trophy was won by the Projectionists' Recreation Club, comprised of members of Toronto Local 173, in the recent annual Canadian Picture Pioneers golf tournament. Mr. Taylor, president of CPP, is shown here (center) presenting the trophy to the IA men, left to right: Andrew R. Pura, Frank Cox, A. Byford, and Frank Cross, captain of the team.

itor was Morris Thacker, member of Chicago Local 110, who dropped in to say hello and to get the answer to a technical problem. We were glad to be of service and hope our solution put him on the right track.

• The annual Fall meeting of the New York State Association of Motion Picture Projectionists was held on October 4 at Ithaca, N. Y., with Local 377 acting as host. The meeting was high-lighted by discussions of new equipment and processes by representatives of several leading equipment manufacturers.

Larry Davee, sales manager and engineer for Century Projector Corp., detailed the fundamentals of the new horizontal projection method employed for the current presentation of the VistaVision picture, "White Christmas," at Radio City Music Hall, New York City. Messrs. Neumer and Mulroy of the Bausch & Lomb Optical Co. discussed wide-screen processes, which was followed by a question-and-answer forum. Arthur Meyer, vice-president and general manager of International Projector Corp., who is always a most welcome guest at projectionist gatherings, expressed his appreciation for the fine job projectionists are doing with the new processes. Bill Ingram (Rochester Local 253) displayed and explained the new variable anamorphic lens now available from Projection Optics Co. of Rochester, N. Y.

Election of officers closed the business sessions. The newly elected Association officers for the next two years are George Raaflaub (Syracuse L. 376), president; Earl Tuttle (Binghamton L. 396,), Harry Lackey (Utica L. 337), Henry Jeffrey (Cortland L. 272), vice-presidents; Charles F. Wheeler (Geneva L. 103), secretary-treasurer; E. Francis Larham (Geneva L. 108), George Robinson (Niagara Falls L. 121), Walter Scarfe (Syracuse L. 376), Charles Johnson (Binghamton L. 396), Robert King (Ithaca L. 377), members of the executive board, and Louis B. Goler (Rochester L. 253), sergeant-at-arms.

A feature of the midnight banquet, sponsored by host Local 377, Ithaca, was the presentation of a gold life-membership card to Cedric Carpenter for 43 years of devoted service to the Local. James J. Brennan, IA vice-president, made the award. Among the out-of-town guests were Morris I. Klapholz, secretary of the 25-30 Club, and Edward Dougherty, past president of the Club.

Dr. A. N. Goldsmith Honored by the NTFC

Dr. Alfred N. Goldsmith, now at the height of an extraordinary career which embraced teaching, inventive ability and splendid engineering talent in practically all phases of the technical arts (with particular emphasis upon the motion picture and television fields) was tendered a testimonial dinner recently by the National Television Film Council.

One of Dr. Goldsmith's most noteworthy achievements was the invention of the chromatic television system which has gained practically unanimous acceptance by the Tv industry. Dr. Goldsmith's activities are much too long to be recounted in detail here, but among other things he has been a special consultant to RCA, Eastman Kodak, Co., the Rockefeller Center realty development, and RKO Theatres.

Not the least interesting facet of Dr. Goldsmith's career is the wholehearted acceptance accorded him by the projection craft. When president of the SMPTE (and as a past president of the IRE) Dr. Goldsmith gave unstintingly of his time and talents to the advancement of the projectionist craft. Recognition of this fact will be readily apparent by



Dr. Alfred N. Goldsmith

reason of his being a gold-card life member of IA Local 306, New York City, and being accorded the same status in the 25-30 Club of Greater New York, Inc., an organization of veteran projectionists.

N. Y. STATE ASS'N HONORS MEMORY OF WILLIAM CONNOLLY



A gold honorary membership card in the New York State Association of Motion Picture Projectionists was awarded to the widow of the late William Connolly, Local 535, Johnstown, N. Y., at the recent Fall meeting in Ithaca. Mrs. Connolly is shown at the extreme left of the photo above, standing between Charles F. Wheeler, secretary-treasurer, and Earl Tuttle, president of the Association. At the right are members of the Association's Ladies Auxiliary.

25 Years Ago — October 1929

● The IA General Executive Board convened at the Royal York Hotel in Toronto during the convention week of the AF of L . . . A 20-acre public park in Chicago was named in honor of the late Samuel Gompers. . . . At the AF of L convention in Toronto, Tom Maloy, business representative for Chicago Local 110 and delegate to the convention, was chosen to represent the American trade movement at the British Trade Union Congress annual meeting. . . . IA General Office issued a warning to its projectionist Locals against a number of so-called "Projection Schools," which came into being with the advent of sound.

An Evaluation of Optical Sound

This is the last of a series of three articles on the history and present uses of the photocell in theatre sound reproduction.

By ROBERT A. MITCHELL

THE PROCESS of manufacture for the conventional red-sensitive caesium-silver-oxygen cells is interesting. The semi-cylindrical cathode support is silver-plated and the surface of the silver oxidized by moist ozone (a chemically active form of oxygen) to a silver-oxygen compound known as silver peroxide.

Upon the silver peroxide is coated a very thin layer of caesium. This work must be done in a vacuum, the active caesium applied by vaporizing it and letting the vapor condense. When the caesium comes in contact with this surface, it takes part of the oxygen away from the silver peroxide to form caesium oxide.

With less oxygen, the silver peroxide becomes normal silver oxide, which gives the cathode its dull yellowish-brown color. A small amount of metallic caesium and silver remain in the coating, and it is believed that this trace of free metal increases the electrical conductivity of the surface. Now, this particular type of photosensitive surface readily emits electrons when exposed to red and infrared light.

Blue-Sensitive Cells

The cathode of the blue-sensitive cell is made by coating the metal plate with a very thin layer of antimony by the vacuum-evaporation process. Next, this antimony film is exposed to caesium vapor at a temperature slightly above the boiling temperature of water. A compound, caesium antimonide, is formed. This substance is a semi-conductor of electricity. Exposure of this surface to oxygen at low pressure for a short time increases the sensitivity of the cell, presumably by forming a trace of an active form of caesium oxide. The color of the surface thus prepared is bluish-gray.

Being sensitive only to blue and violet light, the caesium-antimony cell is reserved for use with natural-color prints having the soundtrack printed in colored dyes which transmit low red and infrared rays too readily to give good results with red-sensitive cells. Color films having such soundtracks are not, however, used in American theatres at the present time.

Soundtrack Dyes

The most satisfactory dye tracks are those printed in just one color. The blue-sensitive cell, however, requires a red soundtrack, which simply means a combination of two dye-colors, namely, lemon-yellow and magenta. Magenta alone cannot be used with blue-sensitive cells because magenta dye transmits both red and blue-violet light, screening off only the green of the spectrum. And yet a magenta track would be desirable due to the fact that the magenta layer of dye-coupler films (Eastman Color, Ansco Color, Agfacolor, and others) constitutes the "green record" and has excellent image-definition. Maximum response cannot be obtained from magenta tracks unless photocells sensitive only to green light are used.

Green-sensitive photocells have been devised. Examples are the strontium and caesium-bismuth cells. For maximum response from a magenta dye track a green filter, such as the Eastman Wratten No. 61, is placed in front of the cell to mask off any red or blue-violet rays that might produce a higher level of ground noise.

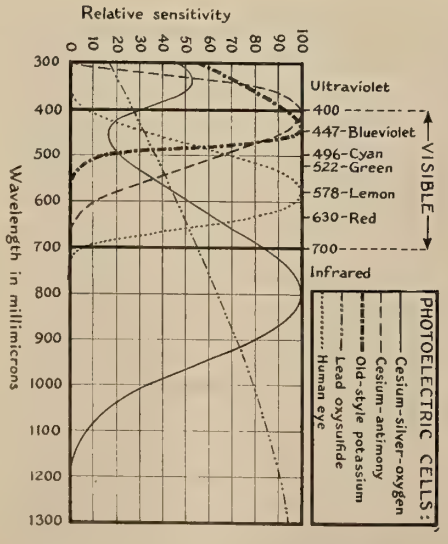


FIG. 5. Color-sensitivity of photoelectric cells.

The caesium-silver-oxygen (red-sensitive) and caesium-antimony (blue-sensitive) phototubes for sound motion-picture projectors are gas-filled, containing a trace of argon to step up the sensitivity five to eight times. For this reason the anode potential supplied to these cells should not exceed 90 volts.

Response Characteristics

The commonly used red-sensitive cells have what is called a Type S-1 response, the sensitivity-peak occurring in the infrared region of the spectrum. RCA phototubes IP40, 868, 918, and 930 are S-1 cells familiar to projectionists. RCA photocell 927 is a "little fellow" about two inches high used in 16-mm equipment.

Among the blue-sensitive cells intended for dye-track reproduction we find RCA cells IP37 and 5581. RCA cell 5583 is for 16-mm projectors. These cells have a Type S-4 response with the peak occurring in the far violet region.

The lead oxysulfide cell, most sensitive to the deep infrared, is the only *photoconductive* cell suitable for sound-on-film reproduction. Its frequency-response characteristics are quite similar to those of gas-filled photoemissive cells. The cadmium sulfide photoconductive cell, on the other hand, is "blind" to variations of light more rapid than 1000 cycles/second.

The light-sensitive plate of the lead oxysulfide cell consists of lead sulfide oxidized on its surface to lead oxysulfide. Metal electrodes contact this surface in such a way that current is forced to flow through the lead oxysulfide. When light falls on this surface, resistance of the cell to the flow of current decreases about five times.

The lead oxysulfide cell has been

advocated because of its large signal-output and extreme quietness — it produces no "photocell hiss" when illuminated by unmodulated light. Use of this cell requires a scanning-beam optical system corrected for the deep infrared.

Cause of Photocell "Hiss"

Photocell hiss, a phenomenon common to all photoemissive cells, posed a serious problem to sound technicians in the early days of sound-on-film recording. The first soundtracks, both variable-area and variable-density, allowed approximately half of the full intensity of the scanning beam to fall on the photocell during moments of silence. In the case of variable-area recording, the unmodulated track was half black and half clear; while with variable-density recording, the track, when unmodulated, was a light gray of roughly 50% lighter transmission. This intensity of photocell illumination was enough to mar the intended silences with a hissing noise, and it also had the disadvantage of allowing the scanning beam to be strongly modulated by scratches and specks of dust on the film.

To overcome these annoyances, methods of "noiseless" recording were introduced. All of them depend on darkening the soundtrack during moments of silence. In variable-area tracks the width of the clear areas diminish with diminishing volume; in variable-density tracks the entire track darkens with decreasing volume. The apparatus for "biasing" the tracks is very simple.

Even though the use of noiseless recording is universal at the present time, the projectionist working with equipment in which sound change-overs are made by switching the exciting-lamp current from one machine to the other must guard against leaving sound volume on at normal levels before and after shows and during intermissions when no film is threaded up to prevent the full scanning beam from reaching the photocells. The hiss is annoying, and when 50- or 60-cycle A.C. is used for supplying the exciters, moderately loud hum will also be heard in the auditorium.

Checking Photocell Circuit

The current flowing in the photocell circuit of a sound-film reproducer is only about one millionth of an ampere at most. So tiny is this current

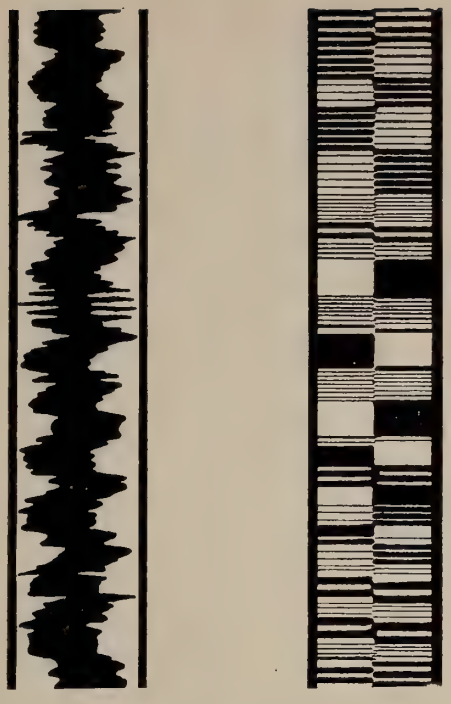


FIG. 6. Push-pull tracks.

that corroded or loose connections anywhere in the circuit will generate clicking or raspy noises, or even total loss of sound. It is always a good idea to check all soundhead connections at least once a year and to make sure that the prongs of the photocell are clean and make firm contact in the socket.

Varying magnetic and electrostatic fields induce currents in conductors. Induced currents in the photocell circuit do not have to be very great to cause hums and other noises in the sound. This is why all photocell leads are carefully shielded and, if very long, run in coaxial cable to prevent attenuation of high frequencies by capacitance-effects. In some equipments the photocell output is "stepped down" by a transformer to minimize the pickup of noise in the wires that connect the photocells to the amplifier. Other equipments use preamplifiers either in the soundheads or very close to them to make the circuits as short as possible.

Contrary to opinion in some quarters, even modern photocells of good quality will eventually wear out. Continual bombardment of the photo-electric cathode by gas ions results in a gradual decrease of sensitivity. Some cells give satisfactory service for years; others, for reasons unknown, "die" in a few months. The life of any gas-filled cell is shortened by excessive anode voltage, of course; and if voltage is so high that the cell glows, the photosensitive surface is destroyed almost at once.

Discard Imperfect Cells

Photocells having loose glass envelopes should be discarded because the entire cell, including the cathode, may vibrate when the projector is running, introducing machine noises into the sound.

Loose connections in the exciting-lamp circuit usually do not produce noises—the filament heats and cools too slowly—but they often cause temporary loss of volume or even sound outages. Careful visual inspection of the exciter while it is burning will reveal any flickering, and tapping the bulb and tugging at the wires ordinarily turns up the source of the trouble.

Sound troubles caused by flickering exciters occur fairly often because the heavy current consumed by the bulb (from 5 to 10 or 12 amperes) heats and burns corroded contacts and other weak points that offer resistance to the flow of current.

Exciting lamps do not last as long as photocells. Like any lamp bulb, they are always in danger of burning out. Slight over-volting seriously shortens the life of the bulb. Exciters with sagging filaments and heavily blackened glass envelopes should always be replaced to avoid burnouts during a show.

Dirt in the "sound aperture" of old-style soundheads cuts down volume by cutting off part of the scanning beam. If a variable-area track is being played, "second-harmonic distortion" will result if the tops of the soundtrack variations are concealed by the dirt. Then, too, if a piece of dust in the sound aperture vibrates, a noise will be generated.

Dirt, Oil Effect Sound

All film has more or less dirt adhering to it. Even negatives which are treated with the utmost care pick up dust by electrostatic action. And when a print gets oily, the dirt and grime really stick fast. So to avoid loss of volume and "husky" sound, clean those old-fashioned "sound gates" after every reel or two.

Sound volume, especially in the higher frequencies, is lost whenever oil gets on the lenses of the optical tube. If a droplet of oil forms on the condensing lens of the usual

"stereopticon" type of optical tube, the resulting concentration of light on the slit may actually cause a marked increase in sound volume with more or less distortion. In such a case the oil droplet acts just like a small lens of very short focal length. When the heat of the exciting lamp vaporizes the oil droplet, the volume will fall off to normal.

No oil should ever get into or even on the optical unit. Naturally, if the projection mechanism leaks oil, some of it is bound to find its way into the sound-head where it isn't needed or wanted. When the oil exists in the form of vapor, volatilized by the hot exciter, it may eventually seep *inside* the optical unit where it will cause all kinds of trouble.

Modern optical tubes are supposed to be hermetically sealed, but manufacturers have found that it is almost impossible to keep the seals intact indefinitely.

Heat Strains Optical Unit

"The optical unit is exposed to a continuous heat-cycle due to the fact that it is located so close to the exciter lamp.* As the unit heats up, different parts, such as the glass lenses and their retaining rings, expand to different degrees. This strains the sealing cement which eventually allows minute air leaks to form. From then on, whenever the optical unit heats up, the air inside expands and escapes through these air leaks.

"When the exciter lamp is turned off, the air inside the unit contracts, creating a partial vacuum which draws air in from outside. If this air is laden with oil vapor, the oil is drawn into the unit and finally condenses inside.

"This continual 'breathing' of the optical unit eventually causes enough oil to collect inside to seriously impair the quality of sound reproduction. This trouble can be largely overcome if the sound-head and projector are kept clean and free of excess oil at all times. The air in the vicinity of the optical system will then contain no oil vapor, and hence the 'breathing' action will not be harmful, if it take place."

Leaky automatically-lubricated projectors and old, worn-out mechanisms which have to be over-oiled to run properly are the chief culprits. In both cases the mischief can be eliminated by repairing the projectors and replacing worn and defective parts.

In the dear, dead days of silent movies, many projectionists periodically gave their mechanisms "kerosene baths" to wash away old, grimy oil from the gears and bearings. This may have been dandy treatment for the Powers projector, which has exposed gear-work; but coal-oil ablutions have no place in these days of sound pictures. Kerosene carries oil into the soundhead.

Deposits of emulsion, dirt, and film-wax on the runners of the soundgate (in the older equipment) and on the polished rotary scanning drum (in modern equipment) may displace the film out of the true focal plane of the optical unit. This focus is rather critical, and cleanliness of the soundhead helps it to "stay put." Dirt is removed from the polished metal parts with an orangewood stick or a copper coin. These won't scratch.

Demagnetizing Not Needed

What about demagnetizing the projector mechanism and soundhead? It's necessary only if you have a magnetic reproducer for CinemaScope tracks. Magnetic tracks are likely to pick up weird noises and suffer loss of sound if magnetic fields exist in the projector parts. Photographic tracks and optical reproducers totally ignore magnetism in the sprockets, film runners, tension pads, idlers, *etc.*, so why waste time demagnetizing things that don't need to be demagnetized?

Exciter focus and cleanliness of the optical-tube lenses are other important points to keep in mind. (We mentioned previously the focus of the optical tube itself.) In practice, the position of the exciter is adjusted until the spot of light on the photocell cathode (the yellowish-brown photosensitive plate) has maximum brightness. This adjustment should always be made when a new exciting lamp is installed. As the exciter ages, however, the filament may sag sufficiently to destroy the adjustment; in such a case the position of the bulb should be altered to restore the full, bright spot of light on the photocell plate.

Equalizing Sound Output

If exciter focus is not up to par, sound output will be below normal. And if there's anything a projectionist dislikes, it's a difference in the sound output of the two projectors. Changeovers should not require the projectionist to boost the gain-setting of the volume control to compensate for a "low" machine.

The better sound equipments provide a means whereby the outputs of the two soundheads may easily be equalized. Before equalization is attempted, however, the optics of both soundheads should be adjusted for maximum output. After this has been done, identical frequency test loops are run in both machines simultaneously, and the output of the "louder" machine reduced until it exactly matches that of the other projector.

When a precise match has been attained, rapid changeovers on the fader will reveal no difference in the loudness of the test tones playing in both machines. Careful work will result in matching to within ½ db, the smallest volume-difference detectable by a trained ear under the most favorable conditions. The use of output meters makes possible even closer matching.

The means provided for balancing outputs differs in different makes and models of sound equipment. One method involves the use of a small potentiometer for the photocell "load resistance." Adjusting this potentiometer, which is usually located in the soundhead or preamplifier, varies the output without affecting the frequency-response of the system.

Another way is to insert a heavy rheostat in series with the exciting lamp. Adjusting the rheostat brightens or dims the exciter, thus changing the sound output without affecting quality. Now, a rheostat rugged enough to absorb the heavy exciter current costs much more than a light potentiometer (similar to the volume

Air Pilots Want Drive-in Info

Projectionists at drive-ins may not realize it, but their theatres are a source of considerable interest to the pilots of planes flying overhead because the drive-in makes a distinctive landmark. The Aircraft Owners and Pilots Assn. has requested drive-ins throughout the country to furnish their exact latitude and longitude, declaring that such information could "be the difference between life and death to some pilots and their passengers."

Information on latitude and longitude can be obtained at local or county engineers offices. The information can then be sent to the New York City offices of the Theatre Owners of America, 1501 Broadway, from where it will be forwarded to the aircraft group.

* Quoted from the "RCA-Photophone Handbook for Projectionists." Second Edition, 1941, pp. 59-60.

control of a small radio-set), but it furnishes excellent control. Some of the older sound equipments had such rheostats as well as voltmeters to show how much voltage was being supplied to the exciters.

Emergency Adjustment

In no case should an exciter be deliberately thrown out of focus to reduce sound output. Doing this may result in uneven slit illumination and hence distort the sound. A popular "emergency" method of reducing the output of a soundhead without affecting sound quality is to wrap one or more turns of clear, blank film around the photocell, holding it in place with rubber bands. Another method is to mask off a small portion of the cathode with rubber bands alone. These methods are strictly "haywire," but they are useful for equalizing outputs until the service engineer arrives to make the adjustment in the proper way.

Push-pull optical recording has been more or less of a plaything in the industry for many years. Fig. 6 shows what variable-area and variable-density push-pull tracks look like. Note that each track is split into two corresponding tracks having sound records 180 degrees out of phase. At any point of full modulation one "half-track" is dark while the other is light.

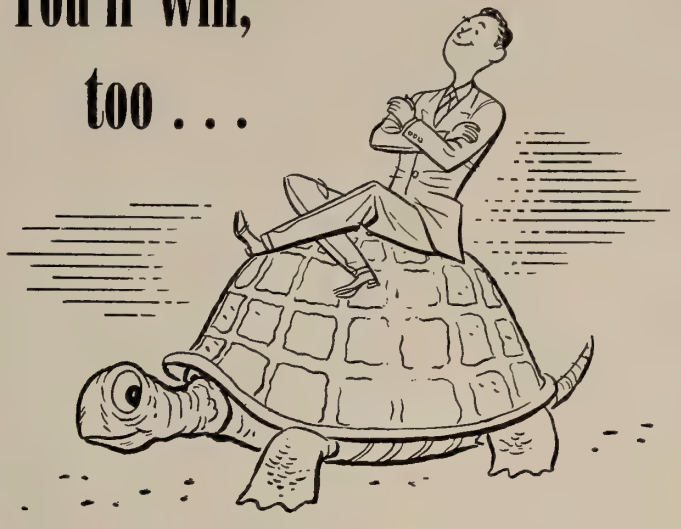
To reproduce these tracks a double-wedge prismatic lens is placed behind the scanning point to direct the modulated light from one half-track to one photocell and the light from the other half-track to a second photocell. Instead of two separate phototubes, a special double photocell, such as the RCA 920 with twin cathodes and anodes, may be used. The outputs of the two cells are combined in the pre-amplifier 180 degrees out of phase, exactly cancelling the 180-degree phasing of the two half-tracks. The combined output is then amplified in the usual way.

Push-Pull Advantages

The advantage of push-pull reproduction lies partly in its greater freedom from optical-distortion effects and in its perfect freedom from noise caused by lateral scratches and film splices. There is no need for "blooping" soundtrack splices when push-pull tracks are used, for no matter how carelessly the emulsion is scraped off, no thumps or clicks are heard.

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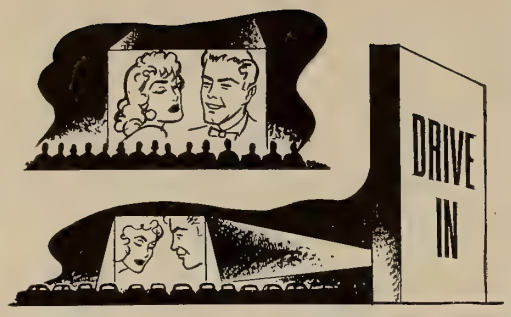
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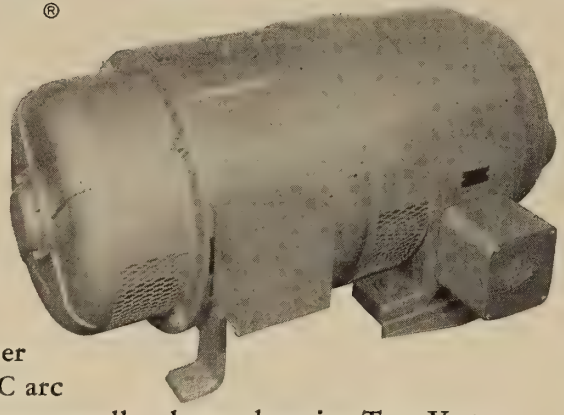
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push-pull reproduction? Splice-lines cross both half-tracks, of course. But the two photocells are 180 degrees out of phase. When the splice-line generates a strong "positive" signal in the output of one cell, it generates a strong "negative" signal in the output of the other. The two signals, being opposed, simply cancel.

An ordinary track played through a push-pull soundhead produces no sound. It is necessary, in such a case, to reverse the electrical phasing by a switching arrangement to play ordinary tracks. Conversely, a push-pull track gives no sound if played in an ordinary soundhead — the two half-tracks exactly cancel one another optically.

Almost any modern soundhead can be fitted for push-pull reproduction. In fact, many manufacturers supply conversion kits and special output-transformers or preamplifiers for this purpose. Push-pull recording was often used in studios before the introduction of magnetic recording to maintain the highest sound quality. The completed push-pull tracks were re-recorded as normal tracks for release printing.

Ordinary optical, or photographic sound reproduction is definitely not a dead duck. It has many points in its favor. And push-pull photographic reproduction is even better than the ordinary kind.

IA OBITUARIES

EVERETT BATY, Sr., 62, member of Local 447, Springfield, Mo., succumbed to a fatal heart attack last month. He complained of feeling ill while visiting Ralph Foster, manager of Station KWTO, in his cabin near Kissee Mills, but died before he could be taken to a hospital. Baty was president of Local 447 for more than 20 years and was one of its charter members. He was a member of Gate of the Temple Masonic Lodge in Springfield, and of the Abou Ben Adhem Temple of the Shrine. Besides his wife, survivors include a son, two daughters, and a stepson.

LEO A. CORTESY, 71, charter member of Local 93, Spokane, Wash., died following surgery. A native of Belgium, Cortesy worked in motion picture theatres in and around Spokane for the last 45 years. Several years ago the Local honored him as one of the two remaining charter members.

BUY U. S. SAVINGS BONDS

HORIZONTAL PROJECTOR

(Continued from page 17)

the use of standard 35-mm film stock turned on its side makes possible the equivalent of a 70-mm image on narrower film, thereby increasing the film size without increasing the tendency to buckle the film and throw the picture out of focus. The tension pads on the horizontal projector are no farther apart than on a standard model, it was said in explanation.

However, it was noted by others that film buckle is caused basically by an expansion of the emulsion of the picture area from the heat of the arc, and that the picture area presented by the horizontal projector is approximately as great as the area presented by wider 65- or 70-mm film used in the Todd AO system and in a projector under development at 20th Century-Fox.

Just how important a part the larger film will play in the future of the motion picture business is still most indefinite. It was rejected before in the late twenties and early thirties as being too expensive and impractical. Barney Balaban says that its use is warranted only where "Tiffany" projection is desired and a screen over 50 feet wide is used. He placed the number of such theatres in the United States at about 100. Other estimates place them as low as 50. These figures presumably do not include drive-ins.

It is difficult to say just what will happen next in these days of violent competition with the Tv interests, but the big film could be the tool required to present a really spectacular show—something that a Tv set couldn't possibly compete with. In any case it stands a good chance of finding important use in large first-class houses and drive-ins.

Technicolor Hires 150

As a result of a 25% increase in orders for color release prints, Technicolor has added about 150 people to its staff since July 1. Improving conditions at the boxoffice and an industry-wide demand for more prints were responsible for the increased business, Dr. Herbert T. Kalmus, president of Technicolor, announced in Hollywood.

Chicago C'Scope Installations

About 33% of Chicago-area theatres have been equipped for CinemaScope, according to a recent estimate by 20th Century-Fox. The figure includes 197 theatres out of a total of 594.

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Giant Drive-in Opens In Detroit Suburb

A giant 1500-car drive-in, designed for all the latest picture and sound reproduction techniques, was recently opened on the outskirts of Detroit near U. S. Route 24. Known as the Jolly Roger, this outdoor theatre has a screen tower measuring 122 by 82 feet. The tower is curved and leans slightly forward so as to direct the largest possible amount of light at the audience in the parked vehicles.

Owned by Nicholas George Theatres, an independent circuit operating in metropolitan Detroit, the Jolly Roger has a projection throw of 540 feet, one of the longest on record.

Installation of projection, sound and field equipment was supervised by Al Boudouris, Theatre Equipment Co., Toledo. This equipment included Century water-cooled projectors, Strong "Super 135" arclamps, Strong rectifiers, Kollmorgen objective lenses and Bausch & Lomb anamorphics for CinemaScope. 1800 watts of undistorted sound is available to the Eprad 3-speaker, in-car sound units.

The screen tower consists of 8 steel frames with 16 bases supported on anchor bolts embedded in 40 cubic yards of concrete, credited with being able to withstand a wind stress of 180 miles per hour. Completely finished in Johns Manville Transite, the tower presents a picture area of 7,500 square feet.

SMPTE Convention in Los Angeles

CONTINUING improvements in the field of magnetic reproduction and recording, and the problem of obtaining more light for large indoor and outdoor theatre screens were important topics at the 76th Annual Convention of the Society of Motion Picture and Television Engineers, held Ocober 18 to 22 at the Ambassador Hotel in Los Angeles.

Some of the technical papers read at the convention that are of particular interest to projectionists are described briefly below. Where a description of the paper was not available at press time, only the title and authors are given.

IMPROVEMENTS IN CONDENSING SYSTEMS FOR 35-mm PROJECTION

R. M. ALTMAN, A. E. NEUMER and H. H. SCHROEDER

Bausch & Lomb Optical Co.

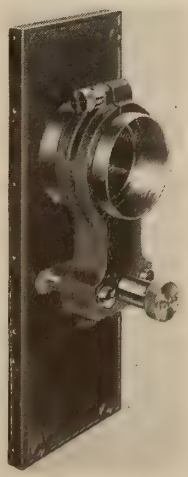
In order to take full advantage of the new $f/1.8$ high-speed projection lenses, faster condensing systems than those now available are required. The design considerations of such systems are discussed and experimental data is given. The increase in screen illumination afforded by these new condensers is accompanied by greater energy at the film gate, necessitating more efficient heat control techniques. Optical devices for achieving this are described.

NEW STUDIO ZOOMAR FOR 35-mm MOTION PICTURES

FRANK G. BACK

Zoomar, Inc., Glen Cove, L. I.

A new Zoomar lens, especially designed for 35-mm motion picture work, will be demonstrated. It has a focal range from 40-mm to 120-mm and a speed of $f/4$. Compared to the old Zoomar-35 it is light (6 lb.) and only 7½ in. long including a coupled, wide-vision viewfinder. This viewfinder is



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without eyepiece or peephole and therefore does not restrict the head movements of the cameraman. Performance of the new lens is so much better than that of the old Zoomar-35 that, even when wide open, its image quality comes very close to that of a good standard 35-mm motion picture lens.

CINEMASCOPE CAMERA LENSES

JOHN D. HAYES

Bausch & Lomb Optical Co.

The wide acceptance by the motion picture industry of the CinemaScope process of motion picture presentation created a pressing need for camera taking lenses of a variety of focal lengths. Described are the optical and mechanical aspects of the development of a series of lenses designed specifically to provide this needed choice.

AN ELECTRONIC COMPARATOR FOR AUTOMATIC INSPECTION OF MAGNETIC SOUND PRINTS

JEROME W. STAFFORD

Sound Dept., M-G-M Studios

This paper describes an electronic system for comparing magnetic sound prints with the master track during the printing operation. In the release printing of CinemaScope pictures the comparator is a useful tool for the automatic inspection of the product.

MAGNETIC HEAD WEAR INVESTIGATION

M. RETTINGER

Radio Corporation of America

For a given film and film wrap angle, magnetic head life is proportional to the film pressure on the head produced by the film tension, the square root of the core radius, the 3/2 power of the pole face depth, the core width, and, in some undetermined manner, the core hardness. More briefly, one may say that (for a constant film and film wrap angle) head life is proportional to the film pressure, volume of removable core material, and core hardness.

CINEMASCOPE IN DRIVE-IN THEATRES

RALPH H. HEACOCK

Radio Corp. of America

CinemaScope (or any of the other wide-screen, multiple-channel sound, new techniques) presents three important problems to the drive-in theater. The first is a very wide screen. The second is a suitable light source which can provide enough light to illuminate the wide screen acceptably. The third is the possible use of multiple-channel sound. These problems and their prac-



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tical application to currently operating drive-in theaters are briefly discussed.

SHRINKAGE BEHAVIOR OF MOTION PICTURE FILM

C. R. FORDYCE, J. M. CALHOUN
and E. E. MOYER
Eastman Kodak Co.

Shrinkage characteristics of both 35-mm and 16-mm films manufactured by the Eastman Kodak Co. have been evaluated by laboratory measurements and by examination of film in commercial use. Results of these investigations were presented.

MEASURING MAGNETIC STRENGTH OF 16-mm MAGNETIC SOUNDTRACKS

ROBERT SCHWARTZ, SHELDON I. WILPON
and ROBERT A. COMERCI
Bureau of Ships, U. S. Navy

The Material Laboratory at the Navy Yard is in the process of developing a method for measuring the magnetic strength existing on 16-mm magnetic soundtrack by utilizing a nonmagnetic loop for the determination of the absolute surface induction at 400 cycles/sec for "pegging" the relative surface induction vs. frequency characteristic obtained by the "short gap" or other approved method.

This paper shows that this method was found to be a practical method for determining the surface induction recorded on presently available commercial 1¼-in. magnetic tapes, independent of the tape characteristics and the depth of penetration of the recorded signal.

Abstracts of the following not available.

NEW METHODS OF SPLICING FILM

D. C. CHAMBERS AND W. R. HOLM
E. I. Du Pont de Nemours & Co.

IMPROVED HIGH-BRIGHTNESS SCREEN FOR DRIVE-IN THEATRES

PETRO VLAHOS
Motion Picture Research Council

CHROMATICITY CHARACTERISTICS OF THEATRE SCREENS

PAUL ZEFF and JOHN P. LIVADARY
Columbia Pictures Corp.

TOP-NOTCH PROJECTION

(Continued from page 10)

ing in particular features, components and operations, are designed to operate as follows:

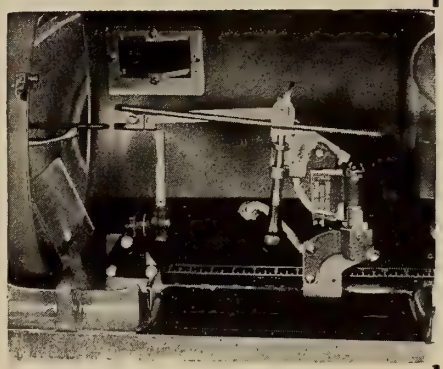
1. Using 9-mm black positive carbons at 85 amperes and 58 arc volts.
2. Using 10-mm black positive carbons at 100 amperes and 60 arc volts.
3. Using 11-mm black positive carbons at 115 amperes and 55 arc volts.
4. Using 10-mm Hitex black positive carbons at 135 amperes and 66 arc volts.

Each successive current increase in the operation of these lamps gives more screen illumination. It is absolutely necessary, of course, that the generators or rectifiers in use deliver not only sufficient amperage but also have proper voltage rating. It is understood, of course, that the most satis-

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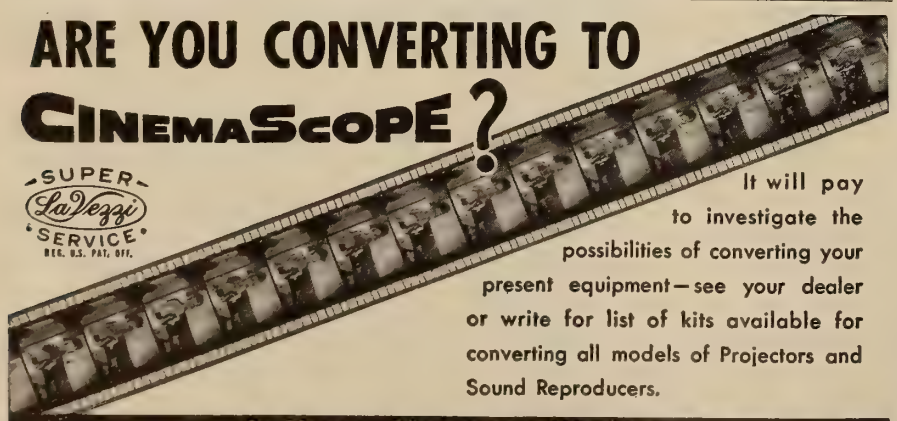
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factory results from the use of a 10-mm Hitex carbon arc pulling 135 amperes is dependent upon the correct source of power supply, either rectifiers or generators having the proper voltage characteristics.

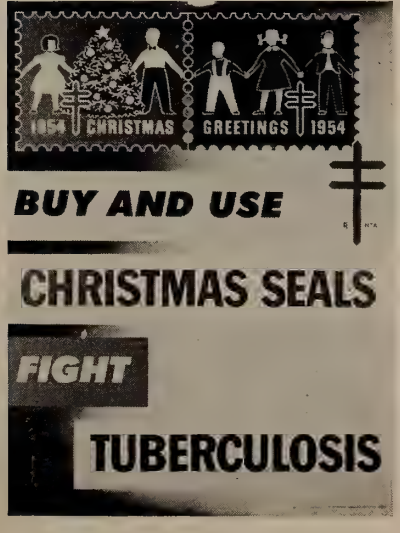
If the theatre already has lamps designed to operate with 9-mm black positive carbons, they may be modified to burn 10- or 11-mm carbons. This , of course, entails the change of a portion of the lamp mechanisms, and usually the addition of blowers for the lamphouse or some satisfactory cooling adjunct, depending upon the type of lamp used.

The Peerless HyCandescent condenser-type arclamp, which operates at 160 amperes and 77 arc voltage using 13.6-mm H. I. carbons, and at 180 amperes and 74 arc voltage using 13.6-mm Hitex Super positive carbons is quite satisfactory in this respect.

It appears from National Carbon Co. figures that the total screen lumens delivered by reflector-type arclamps at 115 and 135 amperes are not widely different from the light delivered by condenser-type arclamps at peak operation.

The choice of which type of arclamp to buy must be guided by both the original and the operating cost of lamps and their attendant power sources. Our opinion is that the overall cost of reflector-type arclamps and attendant power source is far lower than the combination of condenser-type arclamps and generator.

If a filter be placed between the arclamp and the projector, there naturally will be a drop in screen illumination. Thus, an arclamp operating at 115 amperes without a





Finest Lenses Are Needed for New Projection Techniques . . .

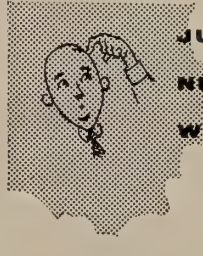
THE ANSWER

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Standard Lens	Variable Focus From
3″	2¼″ to 1¾″
3½″	2¾″ to 2″
4″	3¼″ to 2¼″
4½″	3½″ to 2½″
5″	4″ to 3″
5½″	4½″ to 3½″
6″	5″ to 3½″

WRITE for new literature fully describing this supplementary lens. Wollensak Optical Co., Rochester 21, N. Y.

MASTERPIECES of Optical Craftsmanship by WOLLENSAK

filter will produce as much *net* screen illumination as is obtainable at 135-ampere operation while using a filter. This fact should be considered in determining the type of equipment and the carbon trim to be used.

If the projectors in use are equipped with adequate aperture-cooling blowers, and the arclamps are equipped with blowers to help dissipate the heat, no filters are necessary at 85- 100- or 115-ampere operation. At 135-ampere operation, the use of a filter begins to be desirable; at high amperages they are definitely necessary.

Power Supply Sources

When a power source is being considered, a generator capable of delivering sufficient amperage at the proper voltage is widely regarded as being a better purchase than rectifiers, from the standpoint of initial and operating-cost. From a long-term wear standpoint, the generator is certain to outlast rectifiers by many, many years. If your theatre is served with single-phase current, you must obtain 3-phase current if you wish to operate high-amperage generators, as all except special-order and high-cost generators operate at 3-phase current.

Projectors

Projectors should be equipped with aperture-cooling blowers to help dissipate the heat from arclamps. The heat must be dissipated to insure a picture without an in-and-out focus condition. If the projectors are not now equipped with shutter blades cut down as far as possible, consistent with travel-ghost conditions, the blades should be changed.

By F. W. KEILHACK

Drive-In Theatre Mfg. Co.

While I do not feel that I have the complete answer to Mr. Elzey's question, I should like to describe a recent experience we had with a drive-in theatre near Kansas City. I believe the procedure used in this case will be of considerable help in solving Mr. Elzey's problem.

In the early part of the season, we were called to this drive-in where the arclamps were pulling 130 amperes. Their complaint was that they had a very poor light; also that they were breaking reflectors excessively. They did not have water-cooled jackets, but they did use filters in their lamphouses. We discovered a very poor ventilating system which was allowing the heat from the carbons to build up inside the lamp, thus permitting carbon dirt and gasses to fog the reflectors and generally mess up the lamp interior and the stacks.

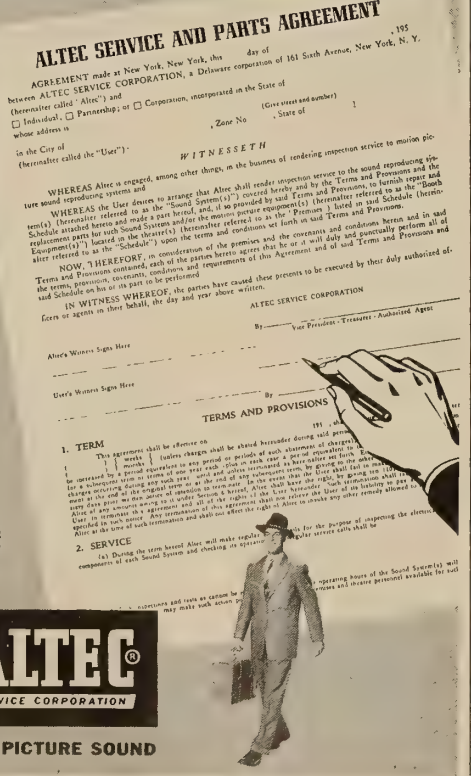
We put in a pair of our single-stack "Atomic Jet" lamphouse blowers, and requested the projectionist to remove the heat filters from the lamp, reduce his amperage to 100, and install a pair of 180 - cubic - feet - per - minute blowers at each mechanism, directing the air to the trap and aperture plate.

The result of this change, even

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WITNESSETH

WHEREAS Altec is engaged, among other things, in the business of rendering inspection service to motion picture sound reproducing systems and

WHEREAS the User desires to arrange that Altec shall render inspection service to the sound reproducing system(s) (hereinafter referred to as the "Sound System(s)") covered hereby and by the Terms and Provisions and the Schedule attached hereto and made a part hereof, and, if so provided by said Terms and Provisions, to furnish repair and replacement parts for such Sound Systems and/or the motion picture equipment(s) listed on said Schedule (hereinafter Equipment(s)") located in the theatre(s) hereinafter referred to as the "Premises") listed on said Schedule (hereinafter referred to as the "Schedule") upon the terms and conditions set forth on said Terms and Provisions.

NOW, THEREFORE, in consideration of the premises and the covenants and conditions herein and in said Terms and Provisions contained, each of the parties hereto agrees that he or it will duly and punctually perform all of the terms, provisions, covenants, conditions and requirements of this Agreement and of said Terms and Provisions and said Schedule on his or its part to be performed.

IN WITNESS WHEREOF, the parties have caused these presents to be executed by their duly authorized officers or agents on their behalf, the day and year above written.

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though the amperage was reduced by 30, was a considerably brighter picture on the screen, the mechanisms are now running much cooler, the excessive heat is being exhausted from the lamp, and they are no longer experiencing reflector trouble.

So, as you can see, the overall net saving to this situation by the installation of these lamphouse blowers—no more reflector breakage, less carbon consumption, cooler mechanisms, and a brighter picture at the tower—offset the cost of the installation many times.

There is another important feature of our lamphouse blower: since it is on the outside of the pipe at the first joint above the lamphouse, it picks up radiated heat from the lamp and exhausts it rather than leaving this heat in the projection room.

By E. B. HEYER

Heyer-Shultz, Inc.

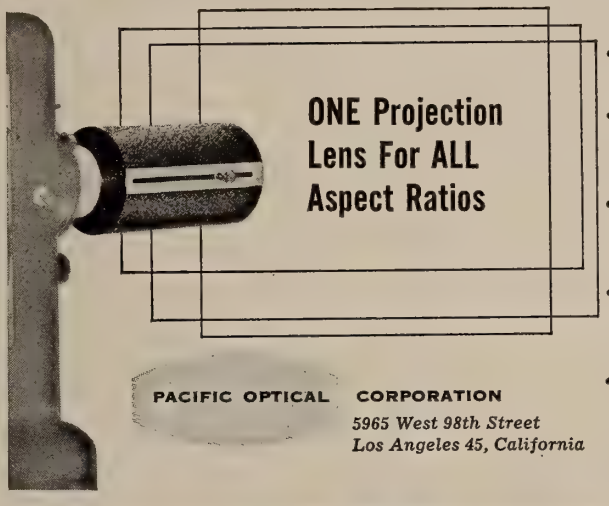
PAT ELZEY has done about everything possible to obtain maximum screen light with his present equipment. As we see it, he will have a screen brightness of approximately 4 or 5 foot-lamberts on his 78-foot wide screen, provided he is using our *aluminized* metal reflector. Should he be operating with our *rhodium*-type reflector, his screen brightness would be 15% less than this.

If Mr. Elzey wishes to obtain a screen brightness of better than 4 or 5 foot-lamberts, he will have to install new lamps that are properly designed for the larger carbon trims and higher amperage. We would venture to say that for what he is attempting to achieve in screen brightness it will be necessary that he burn up to 130 amps, but such information should be obtained from the manufacturer of whatever lamp he might decide to use.

By LEONARD SATZ

Raytone Screen Corp.

WHILE I am not familiar with the Gardiner projector, I do not care especially for the barrel-type shutter. However, this cannot matter too much in this instance. The lenses

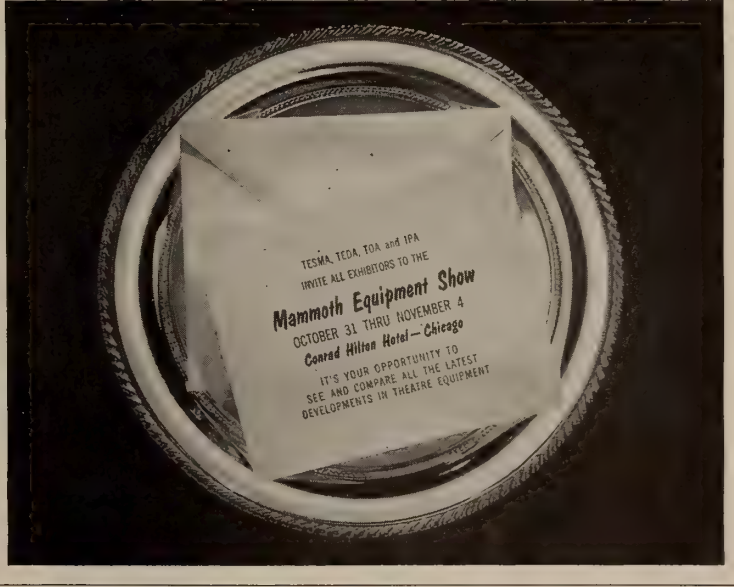


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being used are certainly adequate. The projection throw doesn't matter too much, but the size of the screen image does.

Arclamps now available are recommended by the manufacturer as suitable for projection on a matte white screen up to 45 feet wide. Personally, I don't agree with this and would prefer to limit the screen size to 35 feet in order to conform with SMPTE standards. I understand that the amperage has been increased with 9-mm carbons to 75-80 amps.

Also, my preference is regular glass reflectors for higher efficiency, and these should be changed every 12 months, not because the silvering thereon might go but because the color of the glass changes to yellowish because of the heat.

The old screen is described as being Johns Manville white asbestos siding. It is a rather common practice in the South to use this siding — or white asbestos shingling — without screen paint. This material works out with small screens that are adequately lighted, but large screen areas should definitely use a good quality outdoor screen paint, thus providing a brighter picture because it is a brighter surface than asbestos siding with some white coloring incorporated therein.

I recommend the use of white screen paint of proven quality. Also, if the arcs are not burning smoothly I would use water-cooled jackets, despite the opinion of some people who have not had sufficient experience with them. They are in wide use on the West Coast and in the Southwest, but for some reason have not won wide acceptance in the East.

The most important factor in this instance, of course, is the size of the resultant screen image. The writer is a strong exponent of maintaining SMPTE standards, but so very many theatres are sub-par in this respect.

Data Available

Strong Electric Corp. published a chart (IP for Sept., 1954) which recommended the use of their lamps at certain screen sizes and with various types of screens. They stated that the Mogul lamp can be used on a matte white screen, with good results, on the basis of a 45-foot screen; also, with an aluminized screen on a 50-foot image; also, with the CinemaScope process with a 60-foot image. Just what constitutes a "CinemaScope screen" I would not hazard an opinion, but it must be the same type of surface as an aluminized or other metallic surface. True, the C'Scope anamorphic system loses less light in the transmission process, and this was probably the reason for the different values referred to.

I will venture the opinion that none of the aforementioned combinations will give an acceptable light-level as campared to the *minimum* SMPTE standard of 9 foot-lamberts. Light is like a rubber band — stretch it too far and it breaks!

Mr. Elzey has a tough decision to make. Either replace his lamps with top-amperage jobs or their equivalent; or aluminize his 78-foot screen and put up with all the resulting imperfections of the screen tower.

In the latter instance, most of the arena will get better light at least. The really desirable situation would be a flat white painted screen at 78-feet with an operating amperage of 125 amps.

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1. The names and addresses of the publisher, editor, managing editor, and business managers are:

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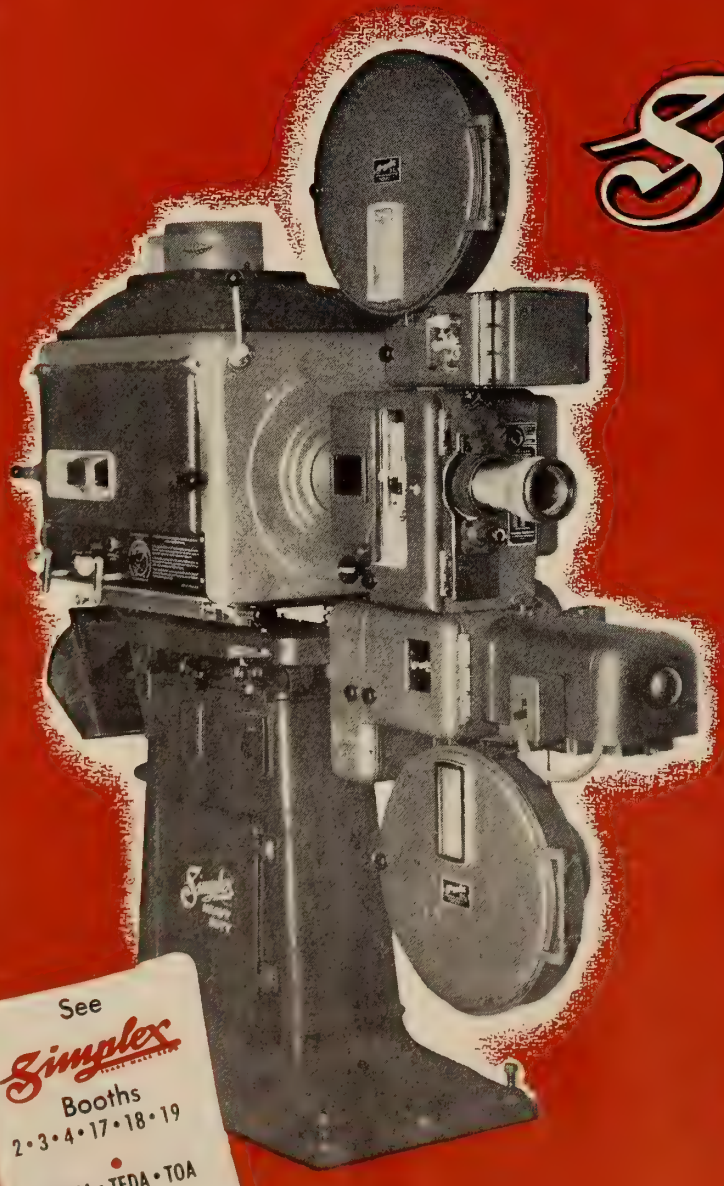
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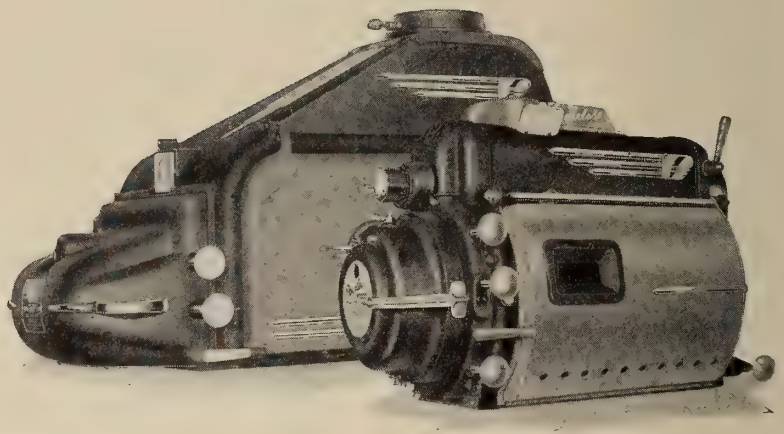
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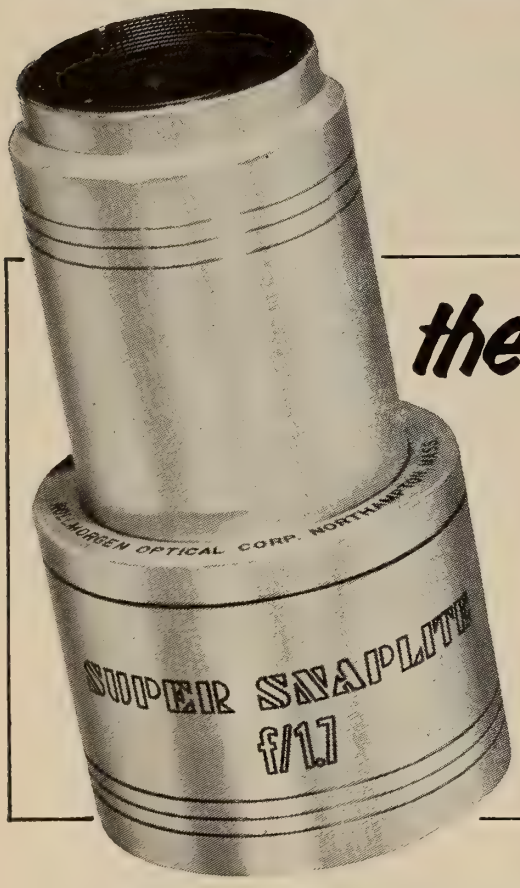
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MONTHLY CHAT

WELCOME indeed was the announcement by Earl Sponable, research director for 20th Century-Fox, at the recent joint TOA-TESMA-TEDA meeting in Chicago, that his company, acting in concert with U. S. Navy research personnel, had come up with a new alloy for use with magnetic sound reproducing heads.

The rapid wear of these reproducing heads, necessitating replacement parts within a span of six months, has long been a major concern of IP on both the technological and economic fronts, and it was a compelling reason for IP's lukewarm reception of this type of sound reproduction. No official transcript of Mr. Sponable's remarks was made available, but this IP reporter gained the distinct impression that this new alloy will increase the life of magnetic reproducing heads by three times.

Magnetic head wear, of course, is in direct proportion to the amount of film passing through the head, which fact accounts for the wide variance in head wear. IP applauds this successful onslaught on a difficult problem which threatened to impede the retention of this form of sound reproduction.

● ● ●

It was really something to see and to participate in the numerous joint "bull" sessions between projectionists and exhibitors at the aforementioned Chicago conclave. Practically every day several such informal sessions were held to the great benefit of all participants. No clash of forces, except on technological grounds, was apparent, this being traceable directly to the extreme informality of the discussions no less than to the recognition on both sides of their common inter-dependence.

As a matter of fact, this tacit appreciation by both exhibitors and projectionists of common problems — the former in terms of keeping their theatres open and the latter on the basis of the certain knowledge that they must have a place in which to work — has been gaining force gradually since the inception of the new projection processes. Today exhibitors are frank to state that they are dependent in large measure for the success of a given operation upon the basic knowledge and procedural know-how of the projectionist — the only technically-minded person in and about the theatre.

IP has long advocated this rapport between employer and employee; and the salutary effects of these discussions indicate the need for holding such sessions at least several times a year on a regional or even local basis.

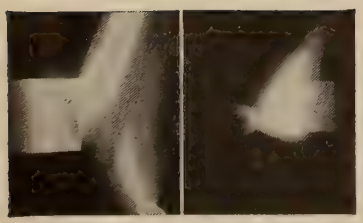


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INTERNATIONAL PROJECTIONIST

VOLUME XXIX NOVEMBER 1954 NUMBER 11

The blessings of the new wide-screen projection processes are intertwined with the necessity, in terms of equipment and procedure, for minimizing the exaggeration of inherent projection defeats. Herewith a few appropriate suggestions as to how best this problem may be overcome.

Wide-Screen Presentation Magnifies Inherent Projection Defects

By ROBERT A. MITCHELL

THE "wide-screen" process of motion-picture projection magnifies two things — the picture, itself, and all its defects inherent in the projection process. The reasons for the poorer quality of modern wide-screen pictures are manifold. You can't mask off large areas from the top and bottom of the tiny film-photographs, magnify what's left, and get the excellent picture quality comparable with conventional projection on 3/4-proportioned, flat white screens to which we are accustomed.

For the past three decades theatre movies were sharp, crisp, brilliant, rock-steady and pleasingly lifelike. Not so today. Exaggerated aspect ratios have banished pictorial quality from the screen. Only a few theatres have resisted the lure and escaped the blight.

Graininess Increased

Excessive magnification of emulsion grain is one of the most obvious defects of wide-screen projection. Fortunately, the grain problem has been partially overcome by the VistaVision process of photography and release-printing. Applied to black-and-white prints, the improvement effected by the large-size VistaVision negative frame is startling. The improvement in color films, however, is only slight, because even the finest-grain color positive and the most carefully prepared imbibition color prints have comparatively low "resolving power."

Then, too, the lighting efficiency of the projector optical system is greatly decreased by wide-screen apertures, necessitating the use of more powerful lamps or aluminum screens, both expedients affecting image quality adversely in different ways. And the use of wide-angle, or short-focus, projection lenses decreases depth of focus, hence exaggerates film flutter, buckling, focus drift, *etc.*

We projectionists notice also another defect of wide-screen projection, which may not be immediately apparent. Just as the tiny film-photographs are greatly enlarged by the short-focus lens to fill the width of the wide screen, so also are side-sway and accidental vertical jumping or dancing of the picture highly magnified. With the advent of the wide screen, rock-steady pictures have all but vanished from the theatre!

Jumpiness an Old Problem

"Jumpy" pictures have always been the bane of the projectionist. A worn or lop-sided intermittent sprocket will cause jumpy pictures even when the movement itself functions perfectly. And a maladjusted or worn film gate can also cause serious unsteadiness of the picture.

Transient spells of picture-jumping are usually the fault of the print. The camera or the printer may be the culprit. Print unsteadiness is usually "spotted" at once by experienced projectionists; and it isn't too difficult to distinguish over-shooting of the film (due to insufficient gate tension or to "sticking" of a new print) from jumpiness which has actually been printed on the film.

But no matter what the cause of

picture-jumping, wide-screen techniques make the unsteadiness worse. Only CinemaScope, which utilizes an aperture having slightly more height than the standard aperture, is blameless on this score. CinemaScope and the anamorphic type of VistaVision are plagued not by vertical jumping of the picture but by excessive sideway or weaving. For the present we shall direct attention to the vertical kind of picture-unsteadiness, because its causes are more numerous and its corrections more troublesome.

The standard sound-film aperture is a rectangle 0.825 wide by 0.600 inch high. These dimensions result in an aspect ratio of 1.375/1 in level projection, and an aspect ratio of 1.333/1 (picture-proportion 3/4) when the projection angle is about 10 degrees.

Years of experience have demonstrated conclusively that the 3/4 picture-proportion (standard aperture) is the most serviceable for pictorial presentation. It is best for motion pictures because it is ideally suited to intimate scenes which occur with great frequency in dramatic films.

The Panoramic Effect

Higher aspect ratios have nevertheless come into use in an attempt to "open up" the screen in the horizontal dimension, even though *visual distraction* from the "center of interest" is increased in wide-screen photography and the dramatic effectiveness of "rapid cutting" and closeups is substantially reduced. High aspect ratios are best suited to panoramic and group scenes, hence their desirability for musicals and other "spectacular" productions.

It is *incorrectly* supposed by many that the newer aspect ratios more nearly conform to the visual area of the eye. The human eye actually has several different kinds of viewing areas, the outer areas being very blurred and almost color-blind. Now, the clearest area, the area of direct visual interest, has exactly the same proportions as the standard motion picture frame, namely 3/4. Beyond this is an intermediate area known as the "comfortable viewing area" which, is not so "comfortable" but that it requires us to move our eyes slightly to perceive clearly all the details it contains. The proportions of this area are approximately represented by an aspect ratio of approximately 1.85/1.

The outermost, or peripheral, viewing area is very useful in daily life, but visually too indistinct for viewing motion pictures with enjoyment. This total area roughly corresponds to such extreme aspect ratios as 2/1 and 2.55/1.

Motion-picture screens are viewed by direct vision regardless of their aspect ratios, hence the absurdity of using extended aspect ratios. The conclusion is inescapable that the most pleasing aspect ratio is the one that corresponds to the area of direct visual interest — *the standard aspect ratio of 1.37/1!*

Intermittent Defects

Now, because the height of a wide-screen aperture is less than that of the standard aperture, greater image-magnification is needed to give *the same picture-height at the screen* when the change is made from normal to wide-screen projection. And all intermittent and other film-registration faults are magnified by the same amount as the picture size is increased!

Intermittent defects which produce a certain range of picture-jump in normal projection (aspect ratio 1.37 /1) give a jump-range 21% greater with an aspect ratio of 1.66/1; 35% greater with the Paramount-sponsored 1.85/1 ratio; and 46% greater with a 2/1 ratio, the height of the picture on the screen being the same in all cases.

In some theatres a 2.35/1 wide-screen aspect ratio is used to correspond with the "optical-sound" CinemaScope aspect ratio. In this case the range of picture-jump is increased fully 71% when a picture-height on the screen identical with the usual standard picture-height is used. Sidewise weaving is increased by exactly the same percentages in all cases of *non-anamorphic* wide-screen projection.

These figures emphasize the necessity for exceptionally accurate intermittent action and film registration in wide-screen projection. There are several test films available for checking the steadiness of theatre projectors, and one of these should be used to obtain an exact measurement of the "jump factor" of each projector.

But this measurement, although simple in theory, is difficult to carry out because even the jumpiest picture likely to be encountered in any theatre "wiggles" only through a fraction of an inch on the screen. So we shall leave the matter of exact measurements to the professional technoligists.

Use of Binoculars

Because a picture on a theatre screen looks jumpy even when the picture wavers a distance of only ¼ inch or even less, the projectionist can get a good idea of the steadiness of his picture by closely examining the screen through binoculars or the Simplex X-L Screenscope. Technicolor prints are especially good for this purpose as these are usually perfectly rock-steady when in good condition. It is best to direct attention to the top and bottom edges of the picture when looking for evidence of image-unsteadiness.

It is entirely possible for a theatre projector to function so perfectly that no picture-jump can be detected even by the most careful measurements by an observer at the screen. The complete absence of unsteadiness occurs only when the slight, but unavoidable, discrepancies in the intermittent starwheel, shaft, and sprocket accidentally cancel one another. The greatest possible range of unsteadiness in modern projectors of good manufacture, however, is so small that it cannot be seen by the audience.

Six-Cycle Tremble

One of the most annoying types of picture unsteadniess is the 6-cycle "tremble" or "dancing" which immediately suggests a bent starwheel shaft or a lop-sided intermittent

Water and Air Cooling For New Simplex X-L

Because of continuing increased demands for more light on large indoor and outdoor theatre screens, the International Projector Corp. has announced a new modified model of the Simplex X-L projector which utilizes both water cooling and compressed air jets to reduce heat at the aperture.

An air compressor is required to provide the necessary jet air stream, and a water circulator with tank will be available for those projection rooms where plumbing is not conveniently available. Complete data on this new development, including a graphic presentation of just how it functions, will be carried in a forthcoming issue of IP.

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sprocket. This projection defect is much more noticeable than it used to be because the tremendous magnifications employed in wide-screen projection readily reveal it.

In 6-cycle tremble the entire picture moves up and down once during each revolution of the intermittent sprocket. Since this movement of the image involves 4 frames of film, and because 24 frames pass over the sprocket every second, the entire cycle is completed 24/4, or 6, times each second.

Regardless of the great mechanical precision with which intermittent movements and sprockets are made, the accuracy of film registration over the aperture is always at the mercy of the method used by the projector manufacturer to fasten the intermittent sprocket to the starwheel shaft. If the method selected is a poor one, the wobble of the sprocket may be from 20 to 40 times greater than the maximum permissible deviation from perfect form in the working parts of the intermittent.

The simplest method of fastening a sprocket to a shaft is the use of a screw inserted in a threaded hole in the hub of the sprocket. When tightened, the screw "brings up" against a flat machined in the shaft. Feed (upper) and holdback (lower) sprockets are held to their shafts in this manner.

This simple "screw-against-shaft" method is unsatisfactory for use with intermittent sprockets. Tightening the screw forces the sprocket away from the shaft on the screw side, and the resulting radial displacement of the sprocket creates a wobble as the sprocket revolves.

A certain 35-mm portable projector, now obsolete, utilized the screw-against-shaft method for fixing the intermittent sprocket. Measurements made on this machine reveal a wobble close to 60 microns (2.36 mils), most of the wobble undoubtedly being due to the unsatisfactory method of fastening the sprocket to the shaft. In a picture measuring 13½ x 18 feet projected with this machine (standard sound-film aperture), the sprocket-wobble would show up as a 6-cycle up-and-down movement of 0.618 inch, enough to be very objectionable.

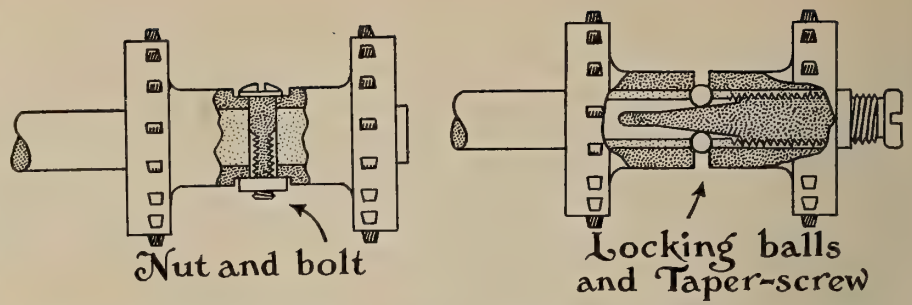


FIG. 2. Later methods of fixing the intermittent sprocket. The "nut-and-bolt method," simple and satisfactory, is used by Simplex and Philips. The excellent "locking balls and taper-screw method" is employed by Motiograph. (Not shown is the Motiograph lateral adjustment or double-bearing construction.)

Taper Pin Connection

The classical method of fixing the intermittent sprocket to its shaft made use of taper pins. There are usually two, and each is driven through holes drilled in sprocket hub and starwheel shaft. This is an effective method, as it does not create undue strain at any one point on the shaft or in the sprocket bore.

Taper pins nevertheless have a serious drawback. They must be forced into their holes rather tightly to prevent their falling out, and the forcing operation may accidentally "spring" the star shaft and introduce serious wobble. Projectionists are rightly apprehensive of the damage which might be inflicted on the delicate intermittent parts when the pins are driven into place with a hammer.

Another method, one popular in Europe, employs a screw inserted into a threaded hole in the end of the star shaft. This method, of course, is suitable only for intermittents having no outboard bearing beyond the sprocket. In one modification, the head of the screw is flat, the under-surface bringing up against the lateral face of the sprocket. In another modification, the screw-head is conical and brings up snugly in a correspondingly tapered hole.

Obviously, both the lateral face of the sprocket and the under-surface of the flat-headed screw must be very accurately machined if the first modification of the end-screw method is to be successful. Such precision greatly increases the price of both screw and intermittent sprocket. Any deviation from true, parallel planes in the surface of these two items will cause the starwheel shaft to become warped slightly when the end-screw is tightened.

In the taper-headed screw method, both the thread of the bore in the shaft and that of the conical screw must be exactly concentric and accurately fitted. The tinest discrepancy causes the tapered head of the screw to pinch the bore of the shaft and thus to force the center line of the sprocket to one side, with consequent wobbling of the sprocket and 6-cycle picture-jump.

Both modifications of the end-screw method, when properly executed, work equally well and represent a decided improvement over the taper-pin method. Maximum wobble is reduced to 30 microns (1.18 mils), resulting in a 0.309-inch picture-jump on a 13½ x 18-foot screen when a standard sound-film aperture is used.

Now let's look at the most modern methods of fastening the intermittent sprocket to its shaft.

Both the Simplex X-L and the Dutch Philips (Models FP-5, FP-6,

(Continued on page 34)

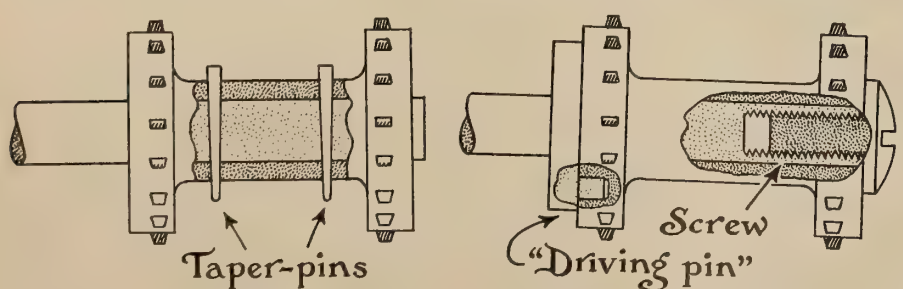


FIG. 1. Two older methods of fastening the intermittent sprocket to the starwheel shaft. Shown in the left drawing is the familiar "taper-pin method"—good, but a nuisance to sprocket-changing projectionists. On the right is shown the more convenient "end-screw method" which, however, induces sprocket wobble unless screw-head and lateral face of the sprocket are very accurately machined.

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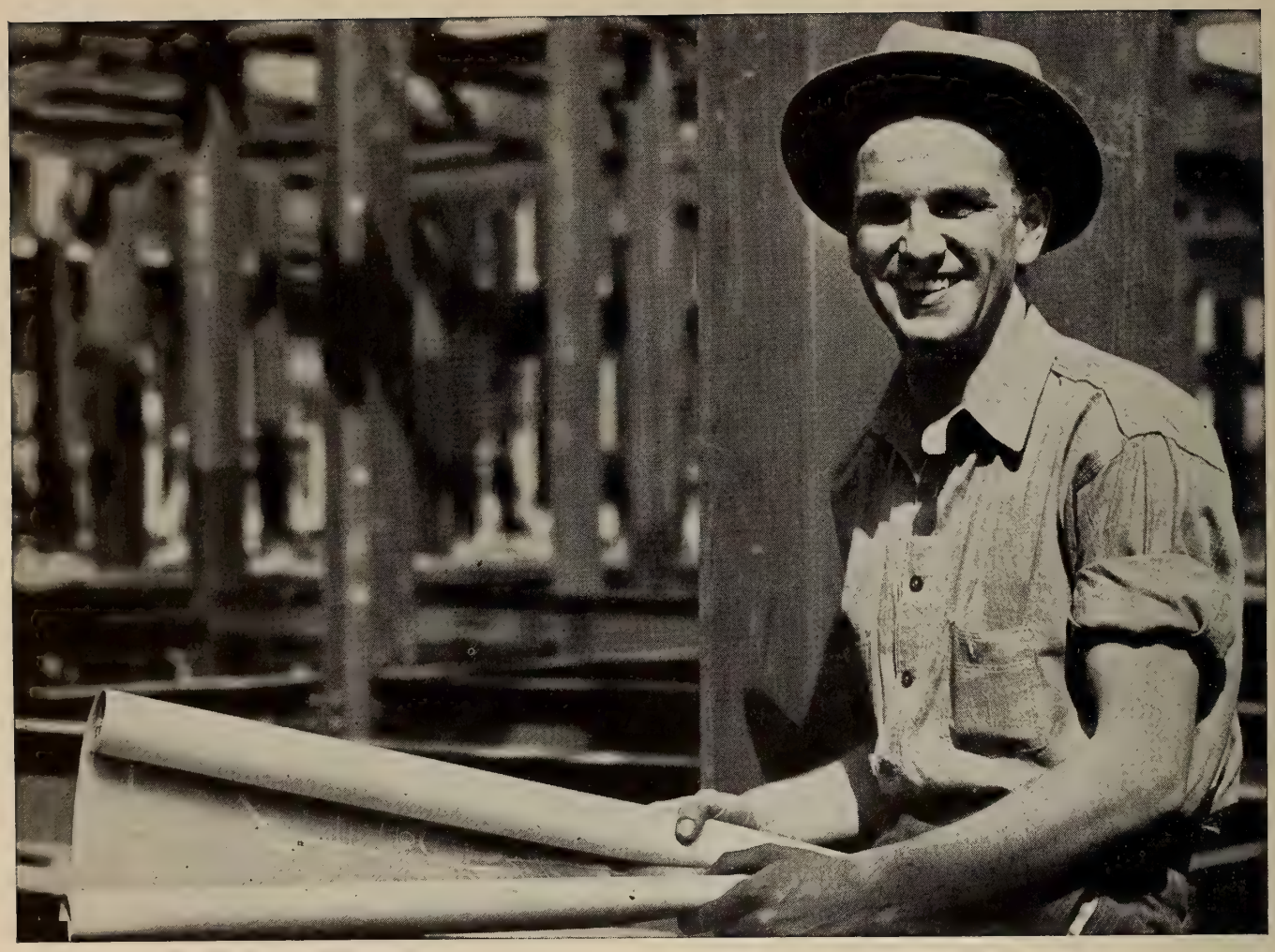
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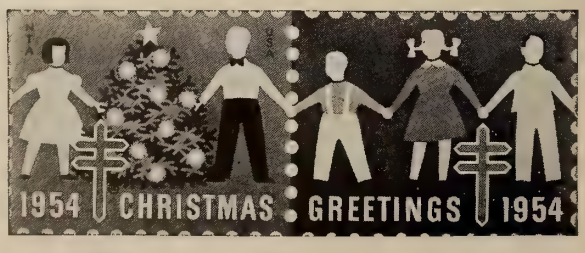


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Elements of Optical Condensing Systems

By A. E. MURRAY
Scientific Bureau
Bausch & Lomb Optical Co.

THE PRIMARY function of a condensing system is to provide maximum illumination on the *screen;* that there is usually more light on the film gate is secondary. Box-office receipts are a function of screen brightness and not of film aperture illumination. Of course, the film gate is the limiting field aperture in the projection system, and since all the light must funnel through the gate, it participates in any increase and thus its image on the screen becomes brighter. The first consideration, however, is to get more light flux to pass through the whole optical train.

The basic physical considerations dictating the present forms of condensing systems are simple. They rest on nothing more difficult than everyday geometry—the kind everyone uses when he looks at a clock or draws straight lines—plus a necessary and very convenient convention regarding the way light is propagated.

With greater demands on condensers to perform more diverse functions ever more efficiently, greater complexity has crept into their design and the primitive principles have been incorporated with more advanced considerations, without, however, losing their cogency. Our principal concern will be with the fundamentals of condenser design, both of lens condensers and mirrors.

The Nature of Light

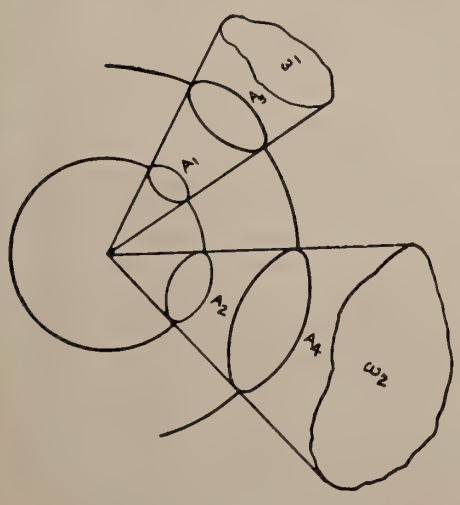
The ultimate nature of light is unknown. Perhaps it will always be so and remain one of the experiences we cannot reduce to something more primitive, along with life and the spiritual verities. Nevertheless, its behavior has been reduced to a few rules-of-thumb which are sufficient to give some control.

An ideal point source of light radiates equally in all directions throughout space, so that if it were placed at the center of a sphere, the interior would be uniformly illuminated, with no part of the wall receiving more light energy or flux than any other. It is perfectly clear that the larger areas receive greater flux in direct proportion to their sizes.

Now, it is inconvenient to circumscribe a sphere about a source each time a measurement of light flow or flux is to be made and to express the flux in terms of areas on this sphere, so the area relative to the total area of a unit sphere is used and given a special name. By analogy with plane angles, the area in question is said to subtend a solid angle at the center of the sphere. Thus we can say in more technical language that from a point source the greater the solid angle subtended by a surface, the greater the light flux intercepted; in fact, the two are strictly proportional.

It is worth while to note that these considerations are direct consequences of the convention referred to previously, that is, the rectilinear propagation of light. If light did not travel in straight lines in free space, we could not expect the inner wall of the sphere to be uniformly illuminated, and we should be forced to more complex descriptions.

FIG. 1. The light flux within the solid angles "w_1" and "w_2" is constant; but the flux per unit area (illumination) is less on areas "A_1" and "A_2" by just the square of their relative distances from the point source.



System as a Pipe Line

But it is inconvenient to represent the true state of affairs in three dimensions on two-dimensional paper, so a compromise is made. In the plane of the paper, technically the meridonional section, the solid angle subtended by a surface or a lens at point source is replaced by the plane angle, and for that infinitely thin fan of rays the flux is proportional to the angle itself.

In the case of a lens system, ideally all the flux collected by the first surface of the system is transmitted through the succeeding surfaces to appear in the image. In the image space exactly the same sort of considerations apply as at the source: the greater solid angles are associated with the brighter images. Thus the larger the area of the last surface of the system as seen from a point image, the more flux flowing through the point and the brighter it is.

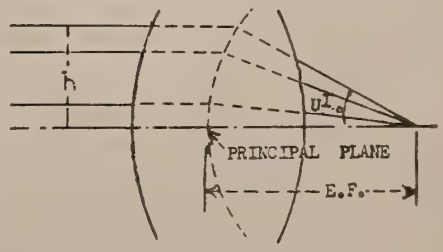
It's a curious fact, readily understood when an optical system is conceived of as a sort of pipe line for light flux, that it does not matter what the illumination or flux density is at any particular point inside the system, the illumination in the final image is fixed by the flux collected by the *first* surface and the area of the *last* illuminated surface seen from the image, *i.e.,* the solid angle subtended by the *exit* pupil.

Basic Illumination Factors

In more technical language, the illumination at a point on the axis of a system, more particularly at the image, will depend upon three factors: (1) the brightness of the source, (2) the light lost in passing through the system, and (3) the solid angle subtended by the exit pupil (loosely, the last lens surface) at the point.

In any actual optical system a certain amount of light is lost to the beam through reflection at the various sur-

FIG. 2. "h" is equal to the product of the equivalent focal length and the sine of U^1.



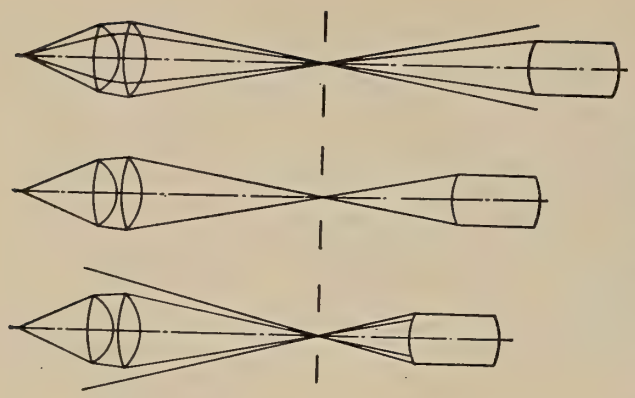


FIGURE 3.
From top to bottom: If the *f* number of the condensers is too large, light is spilled around the lens and thus wasted.
When the condenser and lens are matched, all the light is used and none is wasted—a perfect economy.
If the lens is too fast for the condensers, the former is effectively stopped down optically.

faces, and a further amount is lost through absorption in the glass. This is all taken into account in calculating the percentage of useful light passing out.

It may seem strange at first sight that in this relation there is no mention of the solid angle of the cone of light incident on the first or collective surface of the system, whereas it is obvious to the intuition that the flux through an image must depend directly upon the amount collected.

Extended Light Sources

For all well-corrected, image-forming systems (and condenser systems on the whole fall into this category) there is a proportionality between the half angles on the two sides of the system, the ratio being the magnification. The situation at any other point on the axis is slightly more complicated, but in essence the same physical considerations apply.

In practice, we have not to deal with point sources but with actual extended sources, which act somewhat differently from the commonly considered point origins. The extended source has area, *i.e.*, is an assembly of point sources of finite luminosity and must be treated as such.

Considering more specifically condensing systems, fundamentally their function is to image the light source at the most convenient point in the projection system for optimum performance of the whole system. It is clear that the instance when a source can be placed at the gate of a projector are very few, and as yet those sources amendable to this treatment are quite feeble.

Screen Light Determinatives

The condensing system, then, has the duty of placing the next best substitute for the source, its image, at that point in the system where it will do the most good. By principles previously established, it does not matter where with respect to the projection objective the source image is placed: the illumination on the screen will depend only upon the source brightness, the transmissivity of the system, and the overall *f* number.

It is clear from this illustration that when a point source is imaged at the film gate for maximum utilization of the flux through the system, the cone of light from the condensers must just fill the projection objective, *i.e.*, the *f* number of the condensing system at the film gate must match the *f* number of the objective.

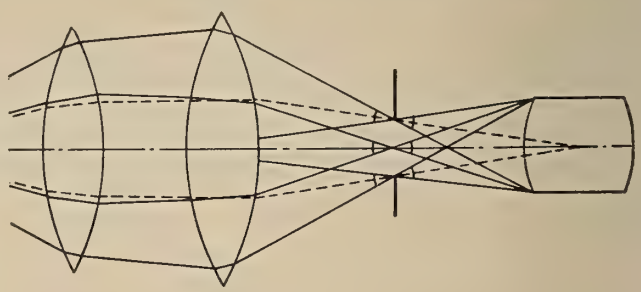


FIGURE 4.
It is necessary to match the *f* numbers of the condenser and the projection objective even though the source be imaged in the latter. Note that the marked angles at the film gate are approximately equal.

If the solid angle of flux from the condensers is *smaller* at the gate than the objective will accept, the latter is stopped down optically, the overall *f* number is smaller than the condensers are capable of, and they are not working at full efficiency.

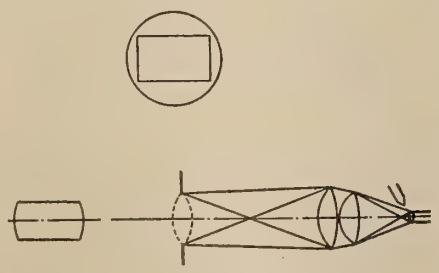


FIG. 5. The common procedure in 35-mm arc projectors. Above: the arc crater is imaged on the film gate. Below: The arc image must be larger than the film gate.

On the other hand, if the condensers deliver a solid angle *greater* than the objective can accept, light is spilled around the objective and fails to get to the screen. In this case, the condensers are optically stopped to the *f* number of the projection system.

Essentially the same considerations apply in the second type of source imaging—when the source is imaged inside the projection lens, or, more accurately, in the entrance pupil of the objective. In this arrangement the basic conditions are somewhat less clear, but a moment's thought will show why here, too, the *f* number of the condensers must match that of the projection lens or the smaller stop becomes the limiting factor.

Arc vs. Tungsten Light Sources

In practice, with extended real sources the first arrangement, that of imaging the source at the film gate, can be used only with those sources which are uniformly bright over their area, which means that it is confined to arcs. The second method is generally employed with tungsten sources, which are used most generally outside the field of 35-mm motion picture projection.

[Such diverse applications as substandard motion picture projection, slide projection, and photo enlargers employ this arrangement, which indeed is the only one which can be used to assure screen uniformity with a source as non-uniform as the incandescent filament. In this case, the film gate, or field limiting aperture (the conjugate to the screen) is necessarily illuminated evenly because it falls well within the convergent cone.]

As a sidelight, it is clear that the last surface of the condenser lens appears uniformly illuminated. It is this uniformly illuminated surface which serves as the virtual source for the gate, wherever it may be, from within

(Continued on page 32)

From Toy to a Great Industry



FIG. 1. The Phenakistoscope, or "magic disc," designed by Joseph Plateau in 1832, first demonstrated persistence of vision.

By JACK E. GIECK

The terms "discovery" and "invention" are often loosely applied to the development of motion pictures. Actually, many minds, many hands contributed greatly thereto, as is made clear by this first of a series of articles which appeared originally in "Movie Makers" magazine, to which we are indebted for many favors.

DID YOU know that the first motion pictures ever taken were in 3-D? Or that stereophonic sound dates back to 1922? lip-synchronized sound having been demonstrated before the turn of the century? or that color movies were shown as early in 1894?

Although these facts may be surprising to some of us recently exposed to various motion picture "innovations," they point up the maxim that movies, like most great inventions, were not created in a "flash of genius" by any one man. Rather are they the product of a technological evolution extending over more than a century.

This process involved the gradual improvement of a number of crude but novel devices—often mere toys —by several generations of gadgeteers and tinkerers (even as you and I) many of whom worked on these hobbies in their spare time.

A wide variety of early projection devices have been collected by the Henry Ford Museum, Greenfield Village, Dearborn, Michigan, source of most of the accompanying illustrations. (Projectionists visiting Washington, D. C., can see another fine collection of early cameras and projectors at the Smithsonian Institute.) But before examining these antiques in greater detail, let us trace some of the fascinating history of "living pictures," as they were called until the beginning of the 20th century.

Roget's Persistence of Vision

The magic lantern was already 160 years old when Dr. Peter Roget happened to notice the peculiar distortion of carriage wheels when viewed through a slatted fence. Based on this discovery, he presented a paper on the persistence of vision before the British Royal Academy in 1825. However, nothing very practical came immediately out of Roget's observations. To be sure, for the next few years a number of physicists spent their leisure hours staring at the world through whirling discs with holes punched in them.

Then, in 1832, a Belgian optical scientist, Joseph Plateau, whimsically drew some figures on the back of one of these slotted shutters to dramatize an effect he had obtained. Plateau called the result a "Phenakistoscope," thereby establishing a precedent followed by the next several generations of living-picture experimenters of assigning ridiculous names to their contraptions.

Prove It To Yourself

Plateau's "magic disc," as the public called it, is shown in Fig. 1.



FIG. 2. The Zoetrope, a cylindrical version of the magic disc first shown in 1833, was another step forward in crystalizing the idea of commercial motion pictures.

The reader may operate it by cutting it out from the page and pasting it on thin cardboard and then punching out the black slots around the periphery. Next, stick a pin through the center, hold it up before a well-lighted mirror, and peer through the back of the slots while spinning the disc on the pin. The figures in the mirror will appear to dance, for reasons which will be obvious to most motion picture technicians.

Although the individual images are not stopped while they are being viewed, as is the case with a modern projector, the slots in the "shutter" are so narrow that each "frame" is glimpsed for a very short "exposure" time, thus minimizing sidewise blur. And persistence of vision hangs onto the image until a new one appears through the next slot.

A year after Plateau's Phenakistoscope, William G. Horner (England) introduced his "Wheel of Life". Two of these "Zoetropes," as they were christened, are shown in Fig. 2. This device is essentially a cylindrical version of Plateau's device. The figure drawings depicting successive stages of motion are printed side-by-side on a band of paper which is bent around the inside of the cylinder. Several of these cards may be seen behind the Zoetropes in the illustration. When the drum is rotated on its axis, the observer watches the figures perform through the vertical slots in the side.

The pictures in the hooded model on the right were illuminated by a candle in the center of the cylinder. These two machines were manufactured in 1867 by Milton Bradley Co., Springfield, Mass.

FIG. 3. The Becker Stereoscope of 1857 led to Coleman Sellers' Kinematoscope in 1861, the first peep-show movie unit.



This sort of thing was not exactly suited to mass audiences. An Austrian army lieutenant, Franz von Uchatius, hit upon the idea of *projecting* living pictures. His technique was to combine Plateau's idea with the magic lantern, or rather with 12 magic lanterns. What he did was to make a series of 12 drawings upon a glass disc which he mounted on a stationary frame. In front of each transparency he then mounted a projection lens, aiming all 12 lenses at exactly the same point on the screen.

Behind the glass disc he fastened his single light source, a limelight, on the rim of a wheel. (The limelight predated the carbon arc in magic lanterns and theatre spotlights. It consisted of a small cylinder of unslaked lime, one end of which was heated white-hot by an oxyacetylene gas jet.) When he turned the wheel, the *light source* moved from one picture to the next, changing the picture on the screen through the 12 positions of the action as each transparency was illuminated in turn. Thus, in 1853, Uchatius projected the first movie—actually, an animated cartoon.

Photography was unable to contribute much to motion picture technology at this stage because of the extreme slowness of the wet plates which served as film at that time. Exposures were often reckoned in *minutes*, and portrait subjects generally had their head clamped in metal jigs to hold them still long enough.

Nevertheless, Dr. Coleman Sellers, a Philadelphia physician, began experimenting with series-pictures of *posed* motion in 1861. These he took with one of the popular twin-lens cameras of the day, and he mounted his stereo-pair prints on the endless belt of a viewer which was similar to the Becker Stereoscope (vintage 1857) Fig. 3, except that he replaced the

(Continued on page 30)

Preparing a Theatre For VistaVision

by F. W. MacDONALD

Member, IA Local 199, Detroit, Mich.

SETTING up a wide-screen projection system to provide a 1.85/1 aspect ratio, such as is prescribed for VistaVision pictures, can be quite a chore when the projection angle is steep, as it is in most balcony theatres. The accompanying keystone presents two serious problems—(a) proper screen masking of the distorted image, and (b) aperture registration with respect to the film frame. Outlined herein is what I consider a positive method of achieving these results:

(1) Insert the proper projection lens to be used for the wide picture.

(2) Make up a 15-foot loop of standard VistaVision stock and run it on the unmasked screen *without an aperture plate* in the projector. The exact picture width is now defined on the screen for a lens of this focal length, part of which is unusable.

(3) Hold a plumb line at the *upper* left corner of the screen image six inches inside the sound track, and chalk-mark the center of the bob on the stage floor. This mark establishes the left side vertical masking boundary. Mark the stage floor for the right side vertical masking boundary by dropping a plumb line from 6 inches inside the *upper* right corner of the screen image.

(4) Using plumb lines centered on the two chalk marks, install the right and left vertical masking.

(5) For an aspect ratio of 1.85/1, measure the distance between the two reference marks and multiply by 0.54 to obtain the height of the picture. Then install the top horizontal masking.

(7) Starting with a blank aperture plate, drill a small hole and with a wide screen carefully file out to the screen masking.

It should be borne in mind that direct proportion between aperture film frame and picture exists only when the projection slope is zero. As the projection slope increases, this relationship is upset progressively. A slope greater than 18 degrees will therefore require excessive vertical cropping if the 185/1 ratio is to be maintained. With this condition, it is advisable to increase the screen height beyond 0.54 times the width.

TransVerteR: Source of Flickerless Arc Power

By WILLIAM SMART
The Hertner Electric Co.

THE word "TransVerteR" has long been synonymous with a source of steady flickerless power for motion picture projection. For nearly 50 years thousands of theatre owners have depended on the TransVerteR as their power source for dependable arc lighting. There are now seven types of TransVerteRs that meet practically all requirements of the theatre projection lamps offered today.

The types of TransVerteRs manufactured are as follows: LV 40/80 at 33 volts D. C. for 1 kw projection; the HI type at 48 volts D. C. is manufactured in two sizes: 50/100 with capacity of 50 amps per lamp standard projection cycle, and the HI 70/140 with capacity of 70 amps per lamp standard projection cycle. The HIH type TransVerteR is also manufactured in two sizes with the same capacities as the HI but at 60 volts D. C. This allows for the use of a spotlamp where required.

The HS 115/230 TransVerteR is manufactured with capacity of 115 amps per lamp standard projection cycle at 75 volts D. C. The MA 80/160 TransVerteR at 85 volts D. C. is supplied where a little higher voltage is required than the HS can supply, but at a lower ampere capacity.

The type HT 135/270 TransVerteR is the newest addition to the TransVerteR family. This gives a burning rate of 75 to 135 amps with a generator voltage of 90 volts D. C.

The type CP TransVerteR is manufactured in two sizes: 200 and 250 amps with a generator voltage of 100 volts. The rating on the CP TransVerteRs is continuous, with an overload rating of 50% for one-half hour. This is different from the other types of TransVerteR which have a continuous rating with a five-minute overload period.

Manufacturing Processes, Materials Pay Off

All TransVerteRs are equipped with pre-lubricated ball bearings that require no lubrication for the life of the bearing. In the manufacture of TransVerteRs, aluminum has been used very generously, which means that weight has been reduced to a minimum. In nearly all types the split-field design has been incorporated, assuring the same uniformity of screen light during changeover.

For all types, the motor rotors are centrifugally-cast with virgin aluminum, assuring a one-piece, no-joint, low-resistance, lightweight, long-life, high-torque motor. This type of rotor will give top speed regulation, minimizing any fluctuations of motor speed resulting from variations of A. C. line voltage.

All TransVerteRs are now supplied with the dual type of ballast rheostats. This is a double ballast rheostat in one frame, eliminating the necessity for two mountings and installations, as would be necessary with single ballast rheostats.

The TransVerteR control panel is simplicity in itself. A voltmeter and field control regulator are mounted in a small compact box that can be installed at any convenient location within easy reach of the projectionist.

The Origin of Photography

LONG BEFORE photography made the camera a common, everyday object, it was a thing of wonder—a magic room where a living picture appeared upon the wall. "Camera" means a room, and the first cameras were just that—rooms big enough to enter. On one wall, there was a very small aperture, a pinhole, which formed an image on the opposite wall of what lay outside.

In the middle of the 16th century, a lens was substituted for the pinhole and the image became more brilliant. Buildings were constructed with a lens on the roof which threw its image onto a table.

People paid admission to gaze in awe as the world outside reappeared in all its color and movement. Street traffic could be seen hurrying by, and pedestrians strolled along unaware that they were being observed. Life cast its shadow on the wall of the *camera obscura,* but it was a living, moving shadow, replete with all its color, and lacking only a voice to make it mimic itself.

There were practical uses for the *camera obscura* beyond amusement. Astronomers found they could better study the sun in eclipse by its image than by direct observation. Artists found the optical picture helpful in solving problems of perspective, and those who could not draw merely traced the image.

Later, the camera was made smaller, a little room that could be carried around on poles like a sedan chair. It was discovered that the observer did not need to get inside the camera but could see the image plainly enough from the outside on a ground glass screen. Small cameras, resembling the viewer section of modern reflex cameras, became popular in the 18th century. The desire to reproduce the image of the camera by some means more accurate and quick than tracing it with a pen, led to the invention of photography in the early 19th century.

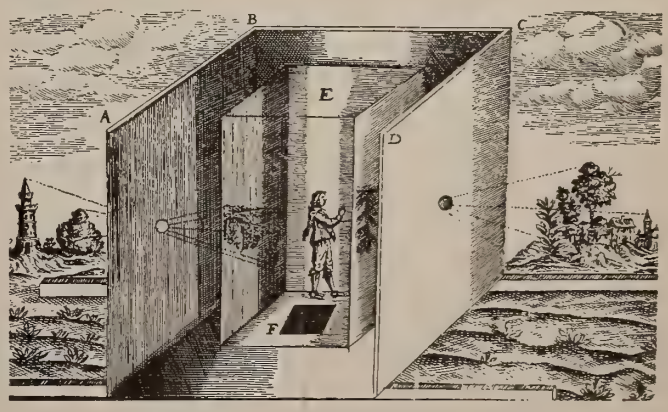


Image was traced by artist standing inside one of the first cameras, which could be moved from place to place like a sedan chair. Earliest known illustration of a "camera obscura." From the book "Ars Magna Lucis et Umbrae" (Amsterdam, Holland, in 1671).





Hearts are always young

Oldsters come—and recall, tearfully, the days of their youth. Youngsters come and find themselves heart and soul in the good old days when bicycles were built for two—and more. That's today's wide-screen entertainment as it thrills the audience—entertainment based on new technics in production, processing, projection. The Eastman Technical Service for Motion Picture Film is helping the industry master these technics. Branches at strategic centers. Inquiries invited.



nd gay—*on the new, wide, wide screen*

Address: Motion Picture Film Department

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

East Coast Division
342 Madison Avenue
New York 17, N. Y.

Midwest Division
137 North Wabash Avenue
Chicago 2, Illinois

West Coast Division
6706 Santa Monica Blvd.
Hollywood 38, California



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6706 Santa Monica Blvd.
Hollywood 38, California

In The SPOTLIGHT

The function of this department is to provide a forum for the exchange of news and views relative to individual and group activities by members of the organized projectionist craft and its affiliates. Contributions relative to technical and social phases of craft activity are invited.

IP is justifiably proud of two major efforts which contribute substantially to the advancement of the projection craft on both the technological and the economic fronts. IP's intimate contact with those people who have the ultimate responsibility for the projection of motion pictures in the theatre — the life-blood of the industry at large—provides the close touch for a rational discussion of such matters.

I. After frequent and prolonged discussions with officials of Theatre Network Television, the organization which sponsors the closed-circuit Tv presentations of such diverse attractions as boxing and performances of the Metropolitan Opera Company, IP is firmly convinced that this medium offers the finest opportunity in years for increased job-hours employment for projectionists and the allied crafts.

This is a double-barrelled shotgun: the regularly scheduled closed-circuit showings of entertainment programs, but, vastly more important to our way of thinking, is the presentation in off-hours (mornings) of sales and demonstration conferences of representatives of nation-wide commercial organizations.

A case in point is the following excerpt from the IP-IA Convention issue for July of this year:

An outstanding example of how Tele-Sessions can make wide use of theatre Tv equipment and motion picture auditoriums on a nation-wide basis is the coast-to-coast sales meeting that was recently organized for the Dodge Division of the Chrysler Corp. Dodge dealers and salesmen in 29 cities were given a preview of the 1955 sales and advertising campaign.

This program originated from television studios in New York and featured top Dodge executives in addition to Tv and radio personalities sponsored by the company.

Another very successful telecast of this type was sponsored by National Dairy Products Co. This firm reasoned that if Tv was effective in selling customers on its product in the home, closed-circuit Tv in the theatre, aimed solely at its dealers and routemen, would be effective in selling them on the company's product.

Produced by the Tele-Sessions division of TNT, this program originated in the Center Theatre in New York and was piped to selected theatres in all Sealtest markets. It was a 1¾-hours show which started at 10 a.m., used 12 sets and required about 100 crewmen and 50 performers.

The foregoing is concerned with manpower and technical facilities ONLY at the originating point in New York. Simple multiplication of the manpower requirements in the larger cities to which such programs are piped will convey an accurate indication of the tremendous potentialities for additional employment provided by this medium. Enuf said.

II. Persistent and insistent demands from our people in the field that some definite program be adopted which would enable the ready indentification of the TYPE of print delivered to theatres led IP to renew its demand upon the producers and the exchanges to effectuate such a plan.

We are both proud and happy to report that IP's efforts in this direction are on the threshold of realization to the extent that in the very near future such print identification should be a routine matter for the now harrassed and slightly bewildered projectionists.

Since IP not only initiated this program but will also be consulted as to the final form of this print identification, projectionists may be assured that in future their problems in this direction will be minimized.

o Baltimore Local 181 scored a signal victory when the management of the Ritz Theatres in the Baltimore area signed a contract with the IA Local. This agreement renewed friendly relations between Local 181 and the Ritz management after a lapse of many years, during which time the theatre chain employed members of the Independent Motion Picture Projectionists' Union. Two years ago the

PROJECTION GROUP AT RECENT TOA-TESMA EQUIPMENT FORUM



Shown here is a representative group of projection men who attended the equipment forum at the combined TOA-TESMA convention, which was held early this month at the Conrad Hilton Hotel in Chicago. Seated, left to right, are: Armand Besse, Local 262, Montreal, Can.; Charles Mueller, chief projectionist at the Radio City Music Hall in N. Y. C. and member of Local 306; H. McLachlan, Local 145, Gary, Ind.; and A. L. Greer, Local 173, Toronto, Can. Standing, left to right: James J. Finn, editor of IP; August Patterson, Local 364, Akron, Ohio; identity of next man to right unknown; Joseph Bernheimer, Local 224, Washington, D. C.; Irl Gordon, Local 364, Akron; Nat Golden, director, Scientific, Motion Picture and Photographic Products Division of the U. S. Dept. of Commerce, and honorary life member of Cleveland Local 160; W. H. Ingram, Local 253, Rochester, N. Y.; James Morris, associate editor, IP, and Ralph A. Peterson, Local 219, Minneapolis, Minn.

National Labor Relations Board ruled the Independent as company-dominated and ordered it disbanded. Subsequent to this ruling, Local 181 officials were successful in organizing the projectionists employed by the Ritz Theatres, and when the contracts with the Independent expired, the theatre management entered into negotiations with Local 181. Under the terms of the new contract all IA projectionists employed by this chain will be paid time and one-half for overtime instead of straight time pay.

Representing the IA Local at the negotiations were Louis P. Sieber, president; Carroll G. Bayne, business representative, and Charles Grauling, trustee chairman. J. Lewis Gautner, managing director for the Ritz chain, acted for the theatre interests.

• The membership of Local 332, Clinton, Iowa, rejected a 5c an hour increase in pay offered by the Central States Theatre Corp., and at the time of writing were considering strike action. However, Local 322 officials are scheduled to meet with the theatre people before any strike goes into effect and it is expected that the matter will be satisfactorily settled.

• Forestalling the possibility of encroachment upon its jurisdiction by rival labor organizations (particularly District 50 of the United Mine Workers), who have been actively engaged in trying to organize the drive-in theatres in the surrounding territory, James V. Sipe, business representative of Pittsburgh Local 171, filed a petition last summer with the Penna. Labor Relations Board for an election of certification as bargaining agent for the projectionists employed in the 65 independent theatres in the Local's jurisdiction. The projectionists concerned turned out 100% and voted unanimously for Local 171 representation, thus making it the first and only IA Local in the state of Pennsylvania to be certified by the Penna. Labor Relations Board.

• Clyde Cooley was re-elected secretary of the Nebraska State Association at the recent annual meeting which was held in Omaha, Nebr. Cooley is also secretary of Omaha Local 343, a post he has held for many years.

• Sound Technicians Local 695 and Cameramens' Local 659, both of Hollywood, Calif., are making a joint effort to persuade the Association of Motion Picture Producers to put into effect a 6 p.m. shutdown at the West Coast studios. The plan was originally proposed at a meeting of the Second District, prior to the IA Convention in Cincinnati last summer, and was coldly received when presented recently before the Hollywood Film Council.

• The accompanying picture (left to right) shows Harry Strong, president of Strong Electric Corp., Toledo, Ohio; C. E. Heppberger, lighting carbon supervisor for National Carbon Co., headquartering in Chicago, and



Jimmy Strong, grandson of Harry. The picture was taken at the Strong summer home at Glen Arbor, Mich. "Hepp" states that when he arrived Harry Strong was explaining Ohm's Law to Jimmy, using several flashlight batteries, wires and meters. The teacher advised that after a few more lessons, plus a few years supported by lots of mashed potatoes, *etc.*, Jimmy will be introduced to arclamps and rectifiers.

• In the limited time at our disposal it was physically impossible for us to visit the quarters of all the companies that held "open house" and dispensed such magnificent hospitality at the recent TOA-TESMA-TEDA convention in Chicago. However, in the short time available we visited the National Carbon Co. headquarters (where the welcome mat was rolled out until the wee hours every morning), and the Motiograph quarters, where charming Mrs. Thor Matthews presided and graciously welcomed all guests. We also spent some time with the National Theatre Supply Co. personnel, the International Projector Corp. representatives, and with the Ampex people.

CEDRIC CARPENTER HONORED BY LOCAL 377, ITHACA, N. Y.

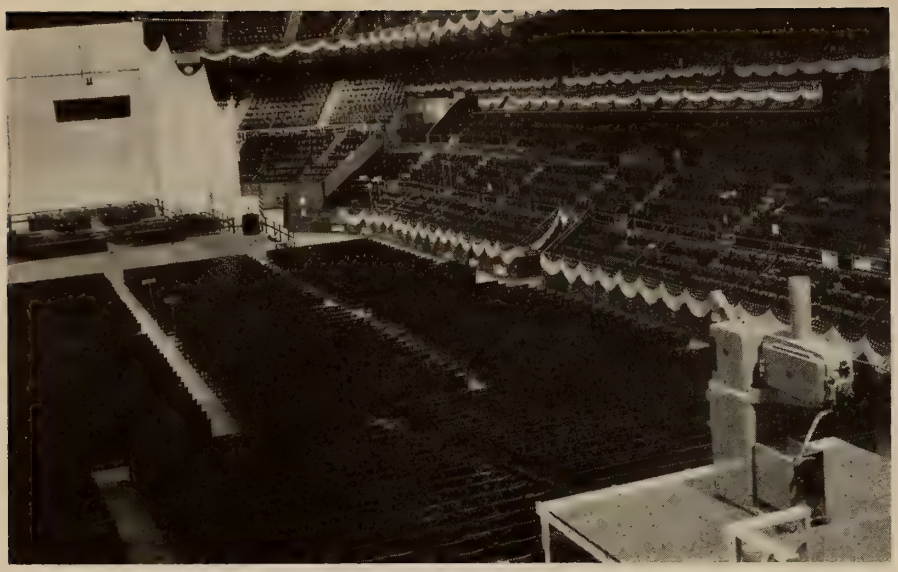


Acting on behalf of Ithaca Local 377, James J. Brennan, IA first vice-president (fourth from left), presents a gold life membership card to its president, Cedric Carpenter, in appreciation for 43 devoted years to the Local. The presentation took place at the recent N. Y. State Association meeting, which was held in Ithaca. Witnessing the award are, front row, left to right: Charles Wheeler (L. 108, Geneva), secretary of the N. Y. State Association; Earl Tuttle (L. 396, Binghamton), past president of the Association; Brennan; Carpenter; Robert King, Local 377 business representative, and George R. Hoener, member. Shown in the back row are Gerald C. Cowan, John Grooms, and John Dietrick, members of the Ithaca Local.

Tv-Radio as Film Theatre Aids

Tv and radio are "ideal" media and have proved conclusively their worth in bringing people into motion picture theatres. They are most effective when used on a "saturation basis" that is, around the clock. So says Earl Hudson, v. p. of American Broadcasting-Paramount Theatres.

Maybe so, say theatremen, but proof should come from strictly theatre people and not from Tv-radio interests.



General view of Madison Square Garden before projection began with the Eastman Arc Model 25 ("hard" carbon arc lighting) 16-mm projector, showing the 250-foot distance between the projector and the screen.

Giant Picture from 16-mm Film

Kodak's projection of 16-mm pictures to a Madison Square Garden audience is another milestone in this fast-growing section of the motion picture field.

THE urge to project "big" pictures is no longer restricted to the 35-mm theatre field. That the trend has spread to 16-mm circles is indicated by the recent premiere of a new educational film, "Freedom to Learn," in Madison Square Garden, New York City. This 27½-minute, full-color 16-mm film was proejected for more than 250 feet onto a screen 32 feet wide in the main arena of the Garden during the recent annual convention of the National Educational Association.

A new record was believed set when the tiny 16-mm frame was magnified more than 1000 diameters, making the total screen area covered by the picture more than 1 million times greater than that of the projector aperture. The showing was doubly impressive when it is considered that the screen used was not a highly reflective metallic type, but merely a muslin backdrop for a temporary stage erected in the Garden for the convention.

Standard Kodak Projector

The print, on commercial Kodachrome film, was projected from an Eastman Arc Model 25 sound projector. The sound output of the projector was connected with the regular Madison Square Garden sound system.

The arclamp with which the Eastman Model 25 is equipped is a 46-ampere arc designed and manufactured by the Strong Electric Corp., Toledo, Ohio. It provides an 80-minute trim when operated as specified. This is sufficient to project 2000 feet of 16-mm film (56 minutes at sound speed), the largest reel size, with an ample margin for trimming the arc in advance of the show. The film "Freedom to Learn" runs only 27 minutes, so there was plenty of margin so far as 7- and 6-mm carbon trim was concerned. Mirror diameter of the lamp is 11⅜ inches.



Joe Coco, member of IA Local 306, N. Y. City, handled the projection chore for the Eastman Arc Model 25 16-mm projector at Madison Square Garden.

In addition to the arclamp, Strong Electric also furnishes the rectifier for the Eastman Model 25 projector. This rectifier is a compact single-phase, 45-46 ampere, 32-volt, continuous 4-tube unit. The speaker and amplifier for the sound equipment are produced by the Altec Lansing Corp. The projector is available with any one of a series of five Kodak projection Ektar lenses, all *f*/1.5 aperture. The particular lens used in the Garden showing was a 3-inch *f*/1.5 Ektar, projecting a measured 32-foot wide image at an estimated throw of 253 feet.

The projectionist at this show was Joe Coco of IA Local 306. He was personally commended by Kodak executives for doing an excellent job in a situation that was "obviously both unusual and difficult." Coco himself declared after the show that "I still can't believe the size and quality of the picture that we got. When I tell different people who weren't there about the show, they don't believe me, especially when I say it was a 32-foot picture at about 250 feet."

Vast Viewing Area

Madison Square Garden, an oval auditorium seating 18,000, is not equipped for large-screen motion picture projection. Exhibition of 35-mm pictures has been arranged at least once before, but no one has ever made an attempt to project a 16-mm film on a theatre-size screen for the audience in this arena.

Biggest problem facing those preparing for the presentation was the screen itself, a temporary muslin stage background used for a pageant put on by New York City school students as another part of the program. Despite the fact that this was considerably less efficient than standard theatre screens, the quality of the results was so high that the NEA commended Eastman Kodak Co. for the excellent results obtained.

Technicolor Profits Rise

A sharp rise in profits for the third quarter of this year was reported by Technicolor, Inc., at a recent board meeting in New York. Consolidated net profits after taxes are estimated at $767,560 compared with $495,500 for the corresponding period in 1953.

LETTERS TO THE EDITOR

Projecting "Green" Prints

To the Editor of IP:

I wonder if your esteemed publication could help solve a problem that has troubled us here lately. Sometimes we have to project a film in the local cinema just a few hours after the delivery of the film from the process laboratory. Later we find that some of it has been damaged by the sprockets. Little nicks appear in the sprocket hole edges. The projectors are all new and have smooth gates and sprockets. Will you please mention some precautions which a projectionist might take to minimize this type of damage.

YOUSAF OMAR

Ambaji Villa Road, Karachi, Pakistan

EDITOR'S REPLY: If your projector and particularly the sprockets are relatively new and in good condition, the cause of damage to new or "green" film is due to too much pressure from the film gate tension pads. The emulsion on new film tends to become sticky under the heat of the projector arclamp, and increases friction at the film gate to a point where the intermittent sprocket nicks or tears the film when it pulls it down. The emulsion on older prints is harder and does not have this tendency to become sticky. According to Eastman Kodak Co., film gate tension in excess of 16 ounces is unnecessary, and settings as low as six ounces will give a steady screen image in some cases.

P. E. Cell Nomenclature

To the Editor of IP:

May I point out three errors in the text by Robert A. Mitchell, page 21 third and fourth paragraphs of his ms. in your September issue.

(1) The cells accredited to C. E. Fritts are commonly accepted as a *barrier-type* of light-sensitive cell. whereas the *photo-voltaic* cell deals with those types of cells in which two or more metals (similar or dissimilar) with prepared surfaces are in the presence of an electrolyte (liquid).

(2) C. E. Fritts was a native of New York City. It is interesting to add for record purposes that Mr. Fritts *prior to 1900* actually applied for a U. S. Patent for recording sound photographically and reproducing it by means of light-sensitive cells. The patent was abandoned because of financial reasons; but 32 years thereafter the patent was reapplied for and subsequently granted, an unheard-of record in U. S. Patent Office practice.

(3) The Photox cell referred to by Mr. Mitchell likewise belongs to the barrier-type of light-sensitive cells.

SAMUEL WEIN

Quincy, Massachusetts

[NOTE: Long-time readers of IP will recall the numerous contributions of Mr. Wein to these columns and, probably, his cognomen of "Selenium-Sam" which stemmed from his pioneer activity in the light-sensitive cell field.]

The Answer is NO!

To the Editor of IP:

I am anxious to gain information anent the "Super Panatar" prism anamorphic lens. From the articles I have read, it appears that various aspect ratios can be obtained merely by turning the scale to the desired ratios, ranging from 1/33 to 2/66 to 1. This is also claimed by the "Superscope" lens.

Should this be the correct interpretation, all that is necessary to show film on 1/33, 1/75, 1/85, 2/3 or 2/55 would be to set the pointer to the correct setting and the correct-size picture would be obtained. Could you advise if the projection lens would have to be altered for each ratio desired? Also, is it necessary to change the aperture plates for each ratio or does the "Super Panatar" lens make all the necessary adjustments?

I would appreciate your assistance, as the theatre where I am a projectionist is arranging to purchase the equipment necessary to show CinemaScope and wide screen, as well as standard pictures. Limited projection room space has to be considered together with obtaining the most suitable equipment. It is sometimes difficult to obtain the necessary information in Australia.

NORMAN G. CAMPBELL

Campbelltown, NSW, Australia

EDITOR'S REPLY: When variable anamorphic lens attachments were first marketed, IP stressed the point that no anamorphic print can be projected except in the aspect ratio for which it was "squeezed." The projection lens need not be altered for each ratio desired, nor the aperture plate either. The controlling factor is the print itself. As explained above, you can *only* project a print in the aspect ratio for which it was processed in the laboratory.

Radio-Projection Engineer Considers IP "Invaluable"

Enclosed is my subscription renewal. As an IP reader for the past 10 or 12 years, I say that your publication is certainly a great aid to me. In my dual role as an engineer at a broadcast station and as a part-time projectionist, I find IP invaluable.

In the mess that exists today in the projection field, you are really the *only* help we fellows have to explain in our terms just what the score is. Your stand for or against various systems is most commendable. Many thanks for all the past information in your magazine and keep up the good work.

JOSEPH M. WILLIAMS

Station WPOR (Local 458),
Portland, Maine

Pacific Optical Vari-Focus Lens

An optical attachment that makes it possible to vary the focal length of a projection lens has been marketed by the Pacific Optical Corp., Los Angeles. Called the "Xpansa," this lens attachment is designed to permit a theatre to project a standard (non-anamorphic) print to full screen width at any aspect ratio while using the same projection objective lens.

The Xpansa lens attachment is calibrated so that various focal-length settings for different aspect ratios can be repeated easily. All optical elements are hard coated. The Xpansa also extends a lens system so as to make unnecessary enlargement of the projection ports as is sometimes required for wide-screen projection.



Pacific's vari-focus attachment shown mounted on objective lens.

Judging a Pension Plan

Money set aside for a worker under a pension plan is real wages and not a gift even if the employer is the sole contributor. Appended are some tips on evaluating the various pension programs.

PERHAPS the most conspicuous development in recent collective bargaining history has been the rapid spread of negotiated retirement plans. As of mid-1950, about 5,000,000 organized workers were covered by contractual pension plans — a threefold increase since 1948. The number has continued to grow since then.

On the surface, this seems to represent a very substantial amount of progress toward overcoming the economic hazards of old age. Unfortunately, the figures are misleading. The *restrictions* and *limitations* of most of these plans are such that, out of the more than 5,000,000 workers described as being "covered," very few have any *real* assurance of ever actually receiving a pension.

Social Security Not Enough in Itself

The figures are, nevertheless, an indication of the manner in which unions are trying to meet the very real and human problems faced by their older members. Few union men can see their fellow-workers tossed out of the shop on their Social Security — with poverty and dependence awaiting them as the end-reward of a long, productive and dues-paying work life — without feeling that something should be done about it.

The Social Security system, even after recent improvements, still remains pitifully inadequate. A private pension plan will, therefore, seem to many to provide a sound and logical solution to the financial problems of the aged. Older members will naturally favor the idea. Younger members who can see far enough ahead to consider the time when they will be in the same boat, will also be inclined to approve.

The subject of pension plans is not a simple one. The union official must rely to a large extent upon the "experts" who do that sort of work for a living. Up to a point, he will have to take their findings at face value.

The paternalistic type of employer usually regards a pension as a gift or gratuity granted as an act of benevolence, or moral duty, to his "old and faithful" employees — in other words, as a bone for *Old Dog Tray*. This is a view which labor cannot accept, for it runs directly counter to the basic principles of trade unionism.

Remember—No Pension Is Free

When a pension plan is brought within the scope of the agreement, both parties thereby acknowledge that it is in fact a part of the hire which the workers are to receive in *exchange* for their labor. It is not "free" and they do not get "something for nothing" as an act of grace on the part of the employer. They earn it and pay the employer for it by doing the work which constitutes their end of the contract.

The performance of that work is all the employer has a right to expect in return for his contributions to the pension fund. The amounts contributed by the employer to the fund, to finance the pension credits accumulated by the group during the term of the contract, should therefore be an irrevocable payment which the employer cannot withhold or recapture, just as he cannot withhold or recapture cash wage payments.

The workers' interest in the negotiated plan is equally strong regardless of whether the fund is set up formally on a so-called "contributory" or on a "non-contributory" basis. In the sense that the contributions paid in by the employer have been earned by the workers, they actually pay the full amount of the cost in either case.

Management's Viewpoint Anent "Costs"

Pensions are a labor cost item, like all of the other economic terms of the working agreement. Viewed solely from this standpoint, it should make little real difference to the employer whether that cost is incurred in the form of contributions to a pension fund, or in the form of higher wages, paid vacations, a health insurance plan, or a reduction in standard working hours.

Under normal conditions most unions must eventually decide whether the interests of the members would be better served by going after a pension or by concentrating on the task of improving the wage scale. This is a decision which each union must make for itself, in the light of its own particular circumstances.

Pension Funds are Limited in Use

In considering this issue, certain facts should be borne in mind. Pension funds are designed to serve but a single major purpose: to help meet the need for an assured income after a person's working life is over. Depending upon the person's present age, that particular contingency may be relatively remote as compared with other more pressing ones.

In contrast, a wage increase can be used for any number of purposes. It may be added to savings or used to provide an immediate higher standard of living. As liquid savings it will be available for other urgent needs as well as that of old age—the education of one's children, medical expenses, living expenses during unemployment, payments on a house, or anything else that chance or choice might require.

These are economic problems which most workers must face long before they reach old age. A pension fund in which their equity is frozen until retirement will not help to meet them. Only cash wages can do that.

Economic Ability to Finance Plan

This being the case, the priority which a union will assign to a pension plan in its negotiations may depend upon the extent of its present old age problem in relation

to the extent to which its members are presently able to meet other pressing economic needs.

In extreme cases, the answer should be fairly obvious. Where the wage scale of a particular group of workers is at or near the bare subsistence level—or too low to provide decent food, clothing, housing or medical care—wage increases should be the first order of business.

Even though the problems of the aging in such a group are very serious, to sacrifice a possible wage increase in order to set up an expensive private pension plan would leave that group "insurance poor". This is one of the many reasons why private retirement plans can never meet the broad national problem of old age isecurity. The Federal Social Security system is the only practical means of solving that larger problem.

PERSONAL NOTES

C. J. BACHMAN has joined the Fairchild Equipment Co., of Whitestone, N. Y. as theatre equipment products manager. Bachman comes from the Stanley-Warner theatre chain where he served as chief engineer. His intimate knowledge of theatre equipment installations over a period of more than 20 years will be of great value in his new position. He recently supervised 32 complete CinemaScope installations and, in addition, was responsible for the complete physical plant of 52 chain theatres.

R. EDWARD WARN, vice president of Westrex, has arrived in New York, where he will take up new duties as director in charge of Westrex foreign operations. He has been manager of the Westrex Hollywood division since 1949.

C. S. PERKINS is now operating manager of Altec Service Corp., succeeding Elmer O. Wilschke, who recently resigned to become vice-president of Fine Sound, Inc. Perkins has been division manager of Altec's Northeastern division since 1947, after being manager of the company's commercial engineering department.

Perkins has an extensive technical background. He was at one time a member of the laboratory department of General Radio Co., and an instructor at the Massachusetts Radio and Telegraph School. He entered the film industry in 1929 with ERPI, serving in various executive capacities.

Among his earlier assignments was the technical supervision of installations and service operations in Ohio, and also as the field engineer in the Detroit area. He was later advanced to other supervisory posts in St. Louis, Providence and Boston. During World War II he managed essential war activities at Altec's electronics division at Lexington, Mass.



C. S. Perkins, newly appointed operating manager for Altec Service Corp.

LYMAN SUITER has been promoted to general plant manager of the Fairchild Recording Equipment Co., Whitestone, N. Y., manufacturer of Perspecta Sound integrator units.

ROY BOOMER, secretary-treasurer of TESMA, announced his retirement recently after serving in that capacity since the group was reorganized nine years ago. However, Boomer and his wife Charlotte attended the recently concluded TESMA-TOA convention in Chicago.

RALPH KAUTZKY has been appointed acting manager of Altec Service Corp.'s northeastern division, succeeding C. S. Perkins, who has been advanced to operating manager of the organization. Kautzky will direct operational activities of Altec's northeastern engineering field force from the division offices, 254 West 54th St., New York City. He joined ERPI, predecessor of Altec, in 1928.

Succeeding Kautzky as branch manager of Altec's northeastern division is SHELL TRENT, a veteran in the field of theatre sound service, who was a member of the technical field staff of ERPI. His headquarters will be at 254 West 54th St., N. Y. City.

"C & C" Rectifier Data

Arclamp rectifiers designed for big-screen requirements are discussed in Bulletin AL-54 just published by the McColpin-Christie Corp., designers and manufacturers of theatre rectifiers.

The booklet points out that the McColpin-Christie "C & C" line of rectifiers includes a unit to provide continuous D.C. power for any type of standard, wide-screen or 3-D projection, for 1 kilowatt to Hy-Candescent.

Designed with a 12-phase output circuit, the 3-phase units takes 3-phase alternating current from the power line and rectify it into a flickerless light source, the company states. This feature, plus the special "C & C" transformer designed for safet short-circuit vurrent surely provides maximum arc stability. Single-phase units, filtered to give low ripple, are available for locations where 3-phase power can not be obtained.

Dr. John Frayne, Westrex, Named President of SMPTE

Dr. John G. Frayne, engineering manager for Westrex Corp., Hollywood, has been elected to the presidency of the Society of Motion Pictures and Television Engineers for the 1955-56 term.

Dr. Frayne is a recognized technical authority on sound recording and reproducing equipment, his name being known in sound recording studios throughout the world. He is co-author of the widely accepted book on studio recording, "Elements of Sound Recording." He either wrote or collaborated with others in writing more than twenty technical papers, most of which were published in the *Journal* of the SMPTE. He also has had ten U. S. patents granted in his name.



Dr. John G. Frayne, recently elected president of the SMPTE

Dr. Frayne is in charge of all development work for the Westrex Corp. on both magnetic and photographic recording. It is under his direction that the new Westrex equipment for both single- and multi-track magnetic recording has been brought into being and is now in use in many studios throughout the world, including the majority of studios in Hollywood.

Giant Intra-Industry Conclave in Chicago

ONE of the most inspiring and heartening events in intra-industry relations — and still one which did not, in the writer's opinion, realize its maximum possible potentialities — occured in Chicago during the early part of this month. This event was the Equipment and New Processes Forum at the combined conventions of the Theatre Owners of America (TOA); Theatre Equipment Supply Manufacturer's Association (TESMA), and the Theatre Equipment Dealers Association (TEDA).

Because projection processes and equipment are the primary concern of IP, complete candor compels the statement that the much-ballyhooed Equipment and New Processes Forum, which was expected to provide solid, down-to-earth practical information, was a dud. This deficiency in what could easily have been the most informative of all sessions from a technical point of view is traceable directly to its agenda. The program and format of this forum required from the speakers time-consuming expository statements of data which had already been profusely circulated in the industry trade press.

What would have been vastly more interesting would have been explanatory comment and practical suggestions on how to best use the variety of radically different new equipment now being introduced in the theatre field. The kind of comment we are talking about would be informal and directly to the point. It would be most successful during the give-and-take of a hot question-and-answer bull session between manufacturers, exhibitors and projectionists.

Many projectionists attended the forum and took the trouble to travel long distances to get there. They, as well as exhibitors and manufacturer participants, would have jumped at the opportunity to present interesting questions to the forum had not the time been whittled away by the long expository statements of the forum.

It is our opinion that very brief statements by each panel member — to introduce him and start the ball rolling, followed by a longer period of informal questions and answers, might have clarified many of the troublesome technological problems that now beset the film exhibition industry. Some feelings might have been ruffled, but the results might have been of enormous value.

Loren Ryder and Earl Sponable, technical heads of Paramount and Fox, were featured speakers at the forum. Ryder discussed the three types of prints which will be available to theatres for projecting pictures made in the VistaVision process—the standard, the anamorphic, and the new double-frame print which runs on a horizontal film path through a special projector as described in IP last month.

Earl Sponable stated that Fox is now at work on improvements in the CinemaScope process which will give better screen results without any further changes in equipment.

Other speakers included Jack O'Brien, manager of RCA's theatre equipment sales, Leonard Satz, Raytone Screen Corp.; A. E. Neumer, Bausch & Lomb Optical Co., and A. J. Hatch of the Strong Electric Corp.

Panel members were: Fred C. Matthews, TESMA; Nash Weil, TEDA; A. E. Meyer, International Projector Corp.; Louis E. Pope, Fox Midwest; Edwin Gage, Walter Reade Theaters; Joseph Zaro, Bijou Amusement Co.; E. J. Nelson, Ballantyne Co.; John R. Miles, Projection Optics; F. C. Dickely, Altec Service Corp., and Robert Gottschalk, Panavision.

Alex Harrison, Western sales manager of 20th-Fox, served as moderator.



These three beaming gentlemen represented Raytone Screen Corp., at the recent TOA-TESMA convention in Chicago. Standing left to right in front of the Raytone display are Leonard Satz, secretary-treasurer; Wes Thompson of Raytone-Thompson Frames, Sun Valley, Calif., and Sol Shurpin, president of Raytone.

There is no doubt at all, however, that one phase of the convention was a smashing success. The wide variety of displays of the latest in projection, sound and electric power equipment by members of TESMA in the Conrad Hilton Hotel exhibit hall was undoubtedly the most interesting and elaborate ever assembled. It drew compliments from all sections of the film industry — from Hollywood production executives to practical projectionists.

A significant point was the large amount of display space alloted to exhibits of power supply units. This, the writer believes, shows a growing awareness of the need for completely re-equipping many theatres if sufficient light is to be had for presenting high-quality pictures on wide screens.

Correct Use of Variable Anamorphics

IP emphasizes anew the perfectly obvious but never-mentioned FACT that a variable anamorphic lens may be used to project a screen image ONLY in that aspect ratio in which the picture was originally shot in the studio—allowing for a maximum ratio tolerance of between 5 and 10%, preferably the former.

All pronouncements, advertising and editorial, relating to the variable anamorphic lenses which have come to the attention of IP—no less than private conversations with the makers of such lenses—convey the impression that ANY picture may be shown in ANY aspect ratio. This is definitely not so.

IP reiterates its oft-stated advice that extreme caution must be exercised when using any variable anamorphic lens so that the aspect ratio of the projected image will conform, within the aforementioned tolerance range, with the aspect ratio in which the picture was shot.

Definitions of Major Terms In Stereography

Aspect: Either right or left view taken as a whole. Also known as a "field."

Composite Image: The resultant sensation experienced by a spectator by the proper viewing of disparate images.

Diplopia: The conscious sensation of seeing a single object as double.

Discriminating Device: Any contrivance which allows each aspect to reach only the eye for which it is intended.

Disparate Images: Two slightly different views of the same subject, one view being intended only for the left eye; the other only for the right.

Fixate: To direct one's eye upon a point.

Point Pairs: Right and left image points on the screen which, when fused by the spectator, appear as a single point in space.

Snellen Acuity: A measure of the spectator's ability to see the separation between two points close together.

Stereography: The application of stereoscopy to photography.

Stereopsis: Perception of depth by the fusion of disparate images.

Stereoscopic Cinematography: Motion-picture photography which allows the spectator to perceive depth.

Vernier Acuity: A measure of the spectator's ability to see the offset from a line of a portion of that line.

Vertical Divergence: The vertical angle between the optic paths to each eye.

Visual Perception: The mental result of the influence of the psychological condition of the spectator upon a visual sensation.

Visual Sensation: A primitive mental reaction to a stimulation of the retina by light waves.

Compound for Drive-in Screens

RCA announces that "Cinemaplastic," a vinyl plastic compound for brightening and weatherproofing drive-in theatre screens, has been added to its line of theatre products. Manufactured by Protective Coatings, Inc., the compound is asserted to have high reflective power and to provide an economical means of increasing light in many drive-in situations.

Altec Perspecta Sound Unit

Altec Service Co. has announced that its manufacturing subsidiary, Newpaths, Inc., will begin deliveries this month of Perspecta Sound integrator units for obtaining stereosound from a single cued optical track.

To build profitable repeat patronage...



Scene from "THE EGYPTIAN," *20th Century-Fox CinemaScope Epic*

sharpest image, edge-to-edge...

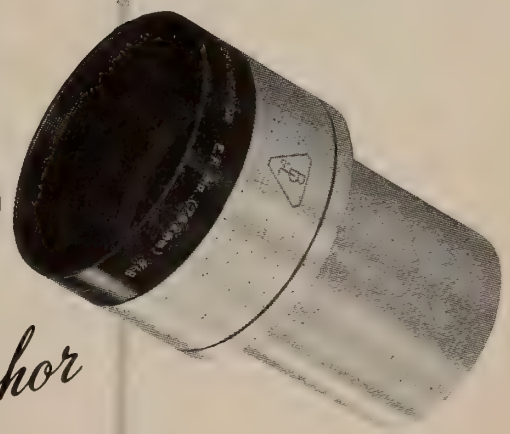
most uniform light distribution...

on any screen!

Bausch & Lomb

- Normal 2D-3D
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Projection Lenses

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The facilities of RCA Service Company make available to thousands of theatres throughout the country the vast technical resources of the Radio Corporation of America.

Problems posed by optical or magnetic sound, single or multiple track, 2-D, 3-D or wide screen techniques are minimized when RCA Service Company is behind the vital, operating heart of *your* house.

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A Radio Corporation of America Subsidiary

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University of Nebraska scientists, working with Bell Telephone engineers, have worked out a system for sending electroencephalograms (brain waves) over a long distance telephone line. This makes it possible for a medical specialist to make a diagnosis involving a patient in a distant city without leaving his office.

The word "electronic" was coined by Michael Faraday in 1832.

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LENS CLEANING PROCEDURE

The vital importance of proper handling of projection lenses with any and all reproduction processes induced the appended communication from Kollmorgen Optical Co. relative to the proper method of cleaning projection lenses. These pointers are offered as a help to projectionists.

Since anti-reflection coating is hard, the same procedure should be used for coated or uncoated lenses.

1. Remove lens from projector at least twice a day for cleaning.

2. Remove all particles of dust or lint with a *clean* camel's hair brush, which should be used *only* for this purpose.

3. Wet sheet of clean "Lens Tissue" in any good liquid lens cleaner similar to the "Guild Craft" lens cleaner, grain alcohol or acetone, and wipe the surfaces gently but thoroughly.

4. Cloths of any character are not recommended for cleaning. Use LENS TISSUE.

5. Dry the surface with a clean dry piece of Lens Tissue.

6. *Never* use cloth of any type or *treated* lens tissue. Never use soap, water, glass cleaners or powders.

7. Never attempt to open Super or Series II Snaplite lenses, since they are factory-sealed to eliminate oil seepage.

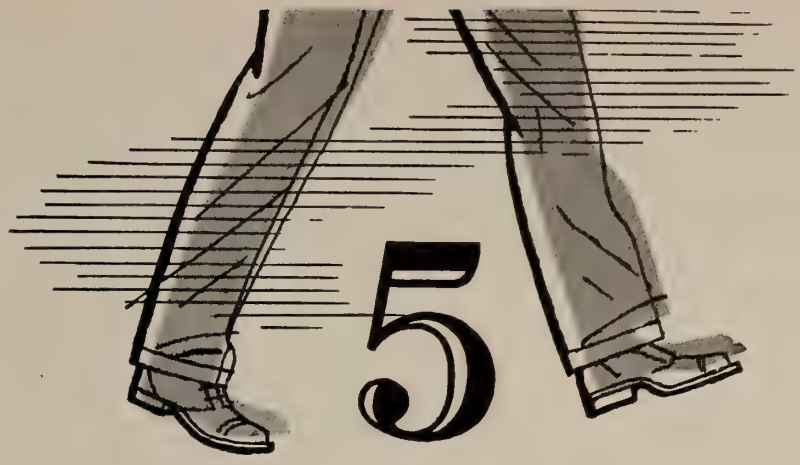
Altec Lansing—Perspecta Deal

Altec Lansing Corp. completed a licensing deal to manufacture Perspecta stereo sound integrator units, and immediately swung into production thereon. This unit is the only piece of special equipment required to for standard optical-track stereo sound reproduction, which system has been adopted by Paramount, Metro and Warner Bros. The Altec integrators will be ready by Fall.

RCA Service Co. Awards

Following members of RCA Service Co. have been honored as a result of a three-month campaign directed at maintaining a high degree of efficiency in the field. Leading in 160 RCA Service branches were Orval Bowers, Flushing, N. Y.; William Davis, Indianapolis; James K. Stewart, Salt Lake City; Lawrence Traeger, Spokane, and Acie Criss, Montgomery, Ala.

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FROM A TOY TO A GREAT INDUSTRY

(Continued from page 16)

knob on the side with a crank.

This first peep-show movie machine he called a "Kinematoscope." As the pictures revolved into view from back to front, they did produce the illusion of movement. But they were not actually pictures of motion, for the individual poses depended upon the models' and photographer's often inaccurate concepts of the phases of a given action.

First "True" Motion Pictures

The first true motion pictures were taken by Eadweard Muybridge in a series of experiments begun at the Sacramento, Calif., race track in May, 1872. Muybridge's now-famous technique involved lining up some 20-odd stereo cameras along the edge of the track, each equipped with an electromagnetic shutter. These shutters were set off by means of switches attached to a series of parallel threads stretched across the track. As a horse galloped by, the threads were successively broken, tripping the switches and setting off each camera just as the horse passed in front of it.

We have all heard of the famous controversy over whether horses ever had all four feet off the ground at the same time. Well, Muybridge's pictures proved that they did, but never when the legs were outstretched, as some artists had drawn them. Some critics charged that they were a mechanical fraud.

To prove that his pictures were authentic, Muybridge determined to synthesize them into the original action. To achieve this, he mounted some of his pictures on Zoetrope cards, putting the left half of each stereo pair on one card, the right half on another. These he placed in two Zoetropes, making the stereo pairs simultaneously visible to the observer by means of mirrors. When the cylinders were rotated in synchrony, doubters could watch a movie of a race horse galloping in 3-D right before their eyes.

Later, to demonstrate his pictures to *groups*, Muybridge built a variation of Uchatius' projection Phenakistoscope which he called a "Zoo-



FIG. 4. Actually designed by Thomas Edison, the unit above resembled Muybridge's device.

praxiscope!" It consisted of a rotating glass disc on which he carefully mounted 17 to 21 glass transparencies of his animals in various stages of an action. In front of the disc was a metal shutter with a single radial slot. By means of a gear train, the shutter made one revolution while the disc moved only one frame.

The result must have looked something like the device shown in Fig. 4 (an early experimental apparatus built by Edison). A magic lantern lamphouse illuminated the picture from the rear, and an objective lens in front projected the picture on a screen. Thus Muybridge projected in 1861 the first *true* motion pictures. As he pointed out, "these apparent movements could be continued for a period limited only by the patience of the audience"—he was continuously projecting the same 21 frames.)

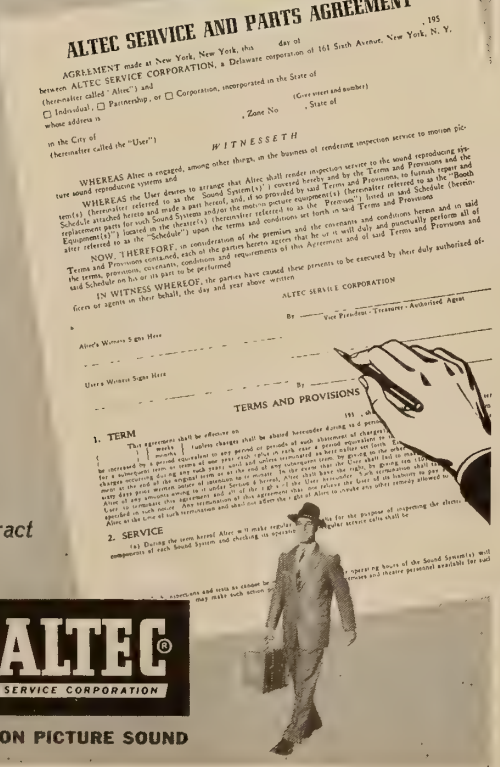
[TO BE CONTINUED]

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YOUR experience with an Altec stereophonic service contract will prove pleasant and profitable!



ALTEC SERVICE AND PARTS AGREEMENT

AGREEMENT made at New York, New York, this day of 195

between ALTEC SERVICE CORPORATION, a Delaware corporation of 161 Sixth Avenue, New York, N. Y. (hereinafter called "Altec") and

☐ Individual, ☐ Partnership, or ☐ Corporation, incorporated in the State of (Give street and number)

whose address is , Zone No , State of

in the City of (hereinafter called the "User")

WITNESSETH

WHEREAS Altec is engaged, among other things, in the business of rendering inspection service to motion picture sound reproducing systems and

WHEREAS the User desires to arrange that Altec shall render inspection service to the sound reproducing system(s) (hereinafter referred to as the "Sound System(s)") covered hereby and by the Terms and Provisions, to furnish repair and replacement parts for such Sound Systems and/or the motion picture equipment(s) (hereinafter referred to as the "Booth Equipment(s)") located in the theatre(s) (hereinafter referred to as the "Theatre(s)") listed on said Schedule (hereinafter referred to as the "Schedule") upon the terms and conditions set forth on said Terms and Provisions

NOW, THEREFORE, in consideration of the premises and the covenants and conditions herein and in said Terms and Provisions contained, each of the parties hereto agrees that he or it will duly and punctually perform all of the terms, provisions, covenants, conditions and requirements of this Agreement and of said Terms and Provisions and said Schedule on his or its part to be performed

IN WITNESS WHEREOF, the parties have caused these presents to be executed by their duly authorized officers or agents in their behalf, the day and year above written

ALTEC SERVICE CORPORATION

By Vice President - Treasurer - Authorized Agent

Altec's Witness Sign Here

User's Witness Signs Here

By

TERMS AND PROVISIONS

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2. SERVICE

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Du Pont 'Cronar' Film Base

Extraordinary structural and operating characteristics are attributed to the new polyester photographic safety film base developed by Du Pont. Produced only in small quantities as yet, this film base, which is trade-marked "Cronar," is asserted to be several times tougher than present types of safety film base, to have less tendency to shrink, and to be equally flame-resistant.

Limited quantities of the "Cronar" base are now available commercially for use as leader material for motion picture processing. It has been produced in experimental quantities since 1952 in a pilot plant at Parlin, N. J. where a large-scale commercial plant, scheduled to be ready in 1955, is under construction.

A condensation polymer-technically known as polyethylene terephthalate, Cronar polyester film base is chemically related to two other recently introduced Du Pont products — Dacron textile fibre and Mylar polyester film which has many electrical and other applications.

Du Pont Test Results Cited

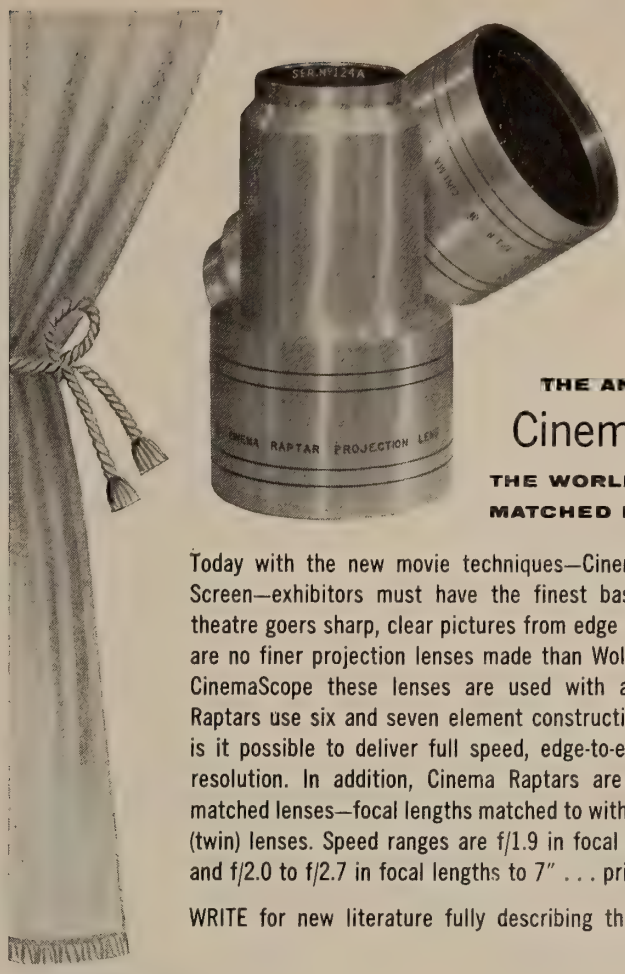
In tests of folding-resistance, Cronar film base is credited by Du Pont to have withstood an average of 17,000 flexings. Motion picture film on Cronar base showed virtually no signs of perforation damage after 3,900 runs through a motion picture projector, it was asserted, while regular safety film perforations wore out after 1,400 projections.

Greater toughness of Cronar base is said to permit the reduction in thickness of motion picture film from the standard 5.5 mils to 4 mils (0.0055 inches to 0.004 inches), making it possible to considerably reduce shipping weight and storage volume. The standard 2000-foot reel can accommodate 2700 feet of Cronar-base film.

The new film base will be edge-marked as Du Pont "Cronar," Safety for the guidance of projectionists and others.

Film industry observers are awaiting some indication as to the cost of this Cronar film, because this would seem to be the most vital factor despite any other advantages credited to this new base. Also, it was pointed out that prints are seldom discarded because of rip or tear damage but rather because of emulsion deterioration due to excessive heat, scratches, *etc.* Buckling characteristics, the result of exposure to high-intensity arcs, is another very important factor.

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Finest Lenses Are Needed for New Projection Techniques . . .

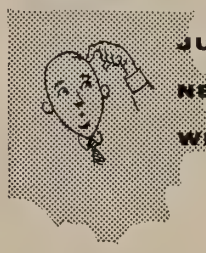
THE ANSWER

Cinema Raptars

THE WORLD'S ONLY PERFECTLY MATCHED PROJECTION LENSES

Today with the new movie techniques—CinemaScope, Vista-Vision, Wide Screen—exhibitors must have the finest basic lenses in order to give theatre goers sharp, clear pictures from edge to edge of the screen. There are no finer projection lenses made than Wollensak Cinema Raptars. (For CinemaScope these lenses are used with anamorphic lenses.) Cinema Raptars use six and seven element construction. Only with such a design is it possible to deliver full speed, edge-to-edge sharpness, and highest resolution. In addition, Cinema Raptars are the world's only perfectly matched lenses—focal lengths matched to within .0025! Marked as matched (twin) lenses. Speed ranges are f/1.9 in focal lengths from 2″ through 5″ and f/2.0 to f/2.7 in focal lengths to 7″ . . . priced from $180 each.

WRITE for new literature fully describing these new Projection Lenses.



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NEED ADJUSTMENTS FOR WIDE SCREEN?

WHAT TO DO WITH NON-ANAMORPHIC RELEASES?



Wollensak

VARI-FOCUS

a supplementary lens for all screen sizes

With the new Vari-Focus lens exhibitors can show all the current screen releases without buying a complete new range of short focus lenses. The Vari-Focus permits you to make adjustments for screen width . . . change the focal length of your standard projection lens quickly and easily. (See table.) The Vari-Focus is a supplementary lens which will produce any wide screen aspect ratio (non-anamorphic) when used in conjunction with a 3″ to 6″ projection lens. The resolution and picture quality will match those of the finest projection lens. Price $235 each.

Standard Lens	Variable Focus From
3″	2¼″ to 1¾″
3½″	2¾″ to 2″
4″	3¼″ to 2¼″
4½″	3½″ to 2½″
5″	4″ to 3″
5½″	4½″ to 3½″
6″	5″ to 3½″

WRITE for new literature fully describing this supplementary lens. Wollensak Optical Co., Rochester 21, N. Y.

MASTERPIECES of Optical Craftsmanship by **WOLLENSAK**

CONDENSING SYSTEMS

(Continued from page 14)

a few mm of the condenser in enlargers and Balopticon projections to a considerable distance as in motion pitcure projection.

The second arrangement obviously provides a more compact system at a given *f* number and focal length projection objective.

Relay Condenser System

A third arrangement has found some application in special problems. This arrangement is essentially the second in that an image of the source is placed in the entrance pupil of the projection lens, but by aid of two extra lenses in the train the gate illumination is increased and made much more uniform. The two extra lenses relay the images of one of the condensers and the filament to their appropriate places, thus the name "relay system".

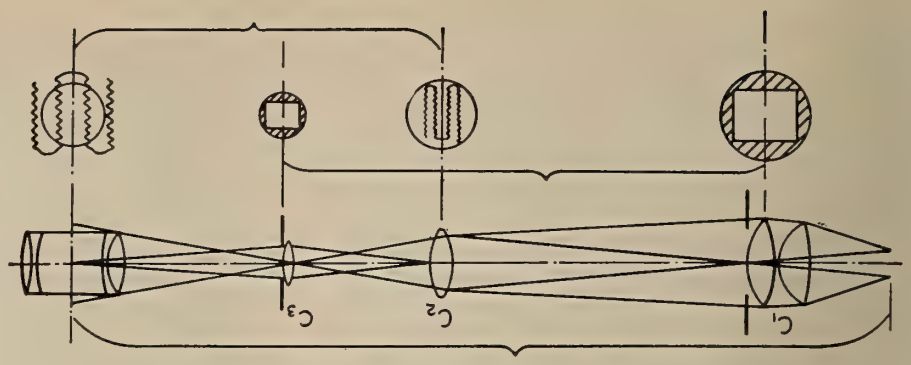


FIG. 6. A typical condenser relay system. Conjugate images are bracketed together.

In a conventional aspheric condenser system (Fig. 6) C_1 is used to image the light source in the lens C_2, which images the last surface of the condenser C_1 on the gate. We have already seen that this surface is uniformly illuminated. At the gate is placed a third condenser lens, C_3, which images lens C_2 and the filament image in the projection lens.

To cut down the spill of light at the gate, the condensers C_1 may be masked as shown in the illustration. This arrangement has the advantage of greater illumination and potentially greater uniformity, but these advantages are purchased at the cost of complications in added lenses and light lost through reflection and absorption. Of course, lens C_3 which receives the filament image must be of highly heat-resistant glass.

Image Magnification Set-up

In order to collect as much flux as possible, the light sources are placed as close as practicable to the first lens of the condensing system. This has the effect of producing a magnified image of the source.

In the first arrangement, the arc is imaged at the film gate at a magnification just sufficient to give an illuminated area covering the corners of the gate. This generally suffices to give an evenly illuminated gate, if the arc itself is uniform, but because the gate is not square a certain amount of useful light is lost in illuminating the long sides of the aperture.

In the second type of condensing system, due regard must be paid to the size of the image of the filament as well as to the *f* number of the system, for if the image is too large for the projection lens, light will be wasted, while if it is too small, the lens may be stepped down optically and thus not deliver the maximum light.

[TO BE CONCLUDED]

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Designed to fit the Standard 2-Cell Eveready Flashlight Molded in one piece of strong Tenite—will not crack, chip, or peel—will withstand long, hard usage in any kind of weather.

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Produced in red or green, and in lengths of 3½" or 2", with colors permanently molded-in.

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- The original variable-focus lens-attachment.
- Projects non-anamorphic prints to full screen height regardless of aspect ratio.
- Provides perfect matching for dual strip 3-D projection.
- Saves the price of numerous lenses of different focal length.
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WESTREX FOREIGN MANAGERS AT N. Y. TECHNICAL MEET

Westrex president E. S. Gregg is shown describing for foreign representatives the new multi-channel amplifier system. Pictured here (left to right) are:

J. A. Todd, recording manager in England; J. Cuevas, manager in Brazil; J. Y. Abe, director and assistant manager in Japan; P. Amourgis, manager in Egypt; R. Senechal, recording director for France and Belgium; M. Storms, Venezuela, manager in the Caribbean area; to the rear, R. J. Hortis, manager in Argentina; W. E. Kollmyer, manager in Australia; to the rear, K. Kagara, recording engineer in Japan; O. J. Forest, Trinidad, manager in the Caribbean area; W. De Mello, Cuba, manager in the Caribbean area; E. S. Gregg, president of Westrex, and C. Alderstrahle, manager in Scandanavia.

Managers and heads of recording departments from some of Westrex Corp. subsidiaries in Europe, Africa, Australia, and Latin America attended a conference in New York, from November 8 through 19. The conferees discussed new equipment operational techniques and surveyed Westrex sales and servicing activities in the motion picture studio and theatre equipment fields, as well as teletype, teletypesetter, communications, and other electronic apparatus.

The featured displays of new equipment included Westrex's latest developments: single and multi-channel sound systems for theatres, the film editing machine, multi-channel magnetic recording systems, the type RA1524 six-position mixer console, the 35-mm newsreel recording system, the new re-recorders, electrical printing equipment, the new hot-stylus lateral feedback disc cutter, and the new black-and-white and color densitometers for studios.

Theatre Tv Hookup for Queen

Large-screen, closed-circuit Tv was used last month to bring the address of Queen Mother Elizabeth of England to guests attending a dinner given for her at the Waldorf-Astoria Hotel in New York City. Her words were carried from the grand ballroom to 1,000 guests in other areas of the hotel through arrangements made by Theatre Network Television. General Precision Laboratory equipment was used for this novel and inspiring inter-building telecast.

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RAYTONE Screens, Hilux Lenses, Thompson Screen Frames, Raytone Screen Paints and Screen Brushes will meet *all* of the manufacturer's claims.
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The World's Best
One push to left or right and all cues are made in 16- and 35-, Standard, Tv, or CinemaScope
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for CinemaScope

WIDE-SCREEN PROCESS UPS INHERENT DEFECTS

(Continued from page 10)

and FP-7) employ the "nut-and-bolt" method. This method should not be confused with the screw-against-shaft method used for fastening feed and holdback sprockets. They resemble each other externally, but there is an important difference.

In the nut-and-bolt method a plain, unthreaded hole is bored all the way through sprocket hub and shaft. Into this hole is dropped a bolt, which is held in place by a nut on the threaded end which protrudes from the opposite side of the sprocket hub.

When the nut is tightened, the sprocket flanges will not be strained out of shape because the sprocket hub is thin and reinforced at both ends by the flanges. Moreover, the shaft is not bent by this method of fastening. Even after the sprocket has been repeatedly removed and mounted again, either in its original position or reversed, the wobble will not exceed 7 microns (0.28 mil). This represents a picture-jump of only 0.073 of an inch on a 13½ x 18-foot screen. Jumpiness does not always attain this *maximum* degree when the nut-and-bolt method of fastening the sprocket is used, of course; but even when it does, the unsteadiness is too small even to be seen by filmgoers in the seats closest to the screen!

The Motiograph Design

The second modern method of sprocket-fastening is truly a marvel, and although it is a bit more complicated than the nut-and-bolt method, it reduces possible 6-cycle dancing of the picture almost to the vanishing point. This second method, which we shall call the "ball and taper-screw" method, is a unique feature of the Motiograph AA mechanism.

The starwheel shaft is hollow as far back as the sprocket, and is provided with a threaded, tapered screw contacting two steel balls which it thrusts outward through holes in the wall of the hollow star-shaft. The balls, thus pushed outward, lock into matching, but smaller, holes in the walls of the sprocket hub.

The actual construction of this sprocket-fastening device in the Motiograph AA has more mechanical detail than is indicated by the accompanying diagram. Not shown, for example, is the Motiograph AA outboard bearing, or the lateral sprocket-positioning screw, or the tubular, threaded insert which prevents the tapered screw from being backed out so far as to drop the two locking balls from their sockets.

Maximum wobble of the intermittent sprocket with the ball and taper-screw method of fastening is only 5 microns (0.20 mil), and this results in a maximum picture-jump of only 0.052 inch in a 13½ x 18-foot picture (standard aperture). This degree of mechanical perfection is desperately needed in these days of wide-screen projection.

Manufacturing Process

There are other factors besides the methods of fastening the intermittent sprocket to be considered in relation to sprocket-wobbling, and many of these involve manufacturing processes and the materials selected for making the intermittent parts. If the starwheel shaft were made of brass, for example, the intermittent would function properly only for a very short time, no matter how careful the workmanship. Inferior steels would likewise be unsuitable for the shaft.

Manufacturers of the better projectors use special chrome-nickel steels for starwheel shafts because such alloys do not shrink, hence are not subject to internal stresses during the hardening process. When the shafts are finally ground to the correct diameter, therefore, they do not show the slightest tendency to warp. The starwheel shafts of good projectors, are ground to a maximum tolerance of 0.04 mil (1 micron).

Admissible Tolerance

The sprocket will wobble if the hole is eccentric with respect to the toothed face, or if it is not perfectly straight. Philips finishes the bore of the sprocket by a grinding process which insures that the diameter of the bore is not larger at the ends than it is in the middle. The bore is thus perfectly straight, and the diameter-tolerance is kept within 0.08 mil (2 microns).

Only after the bore is finished and carefully checked in every respect are the teeth milled and the running surfaces which contact the edges of the film ground. According to projector technologists, the admissible wobble with respect to the bore is under 0.16 mil (4 microns).

[TO BE CONTINUED]

Prefers Stories to "Gimmicks"

The motion picture industry can successfully meet the challenge of Tv if better stories and fewer "gimmicks" are used, according to Ross Hunter, producer of "Magnificent Obsession." A good story, "even if it fits on the face of a postage stamp," will draw customers to the boxoffice, he asserts.

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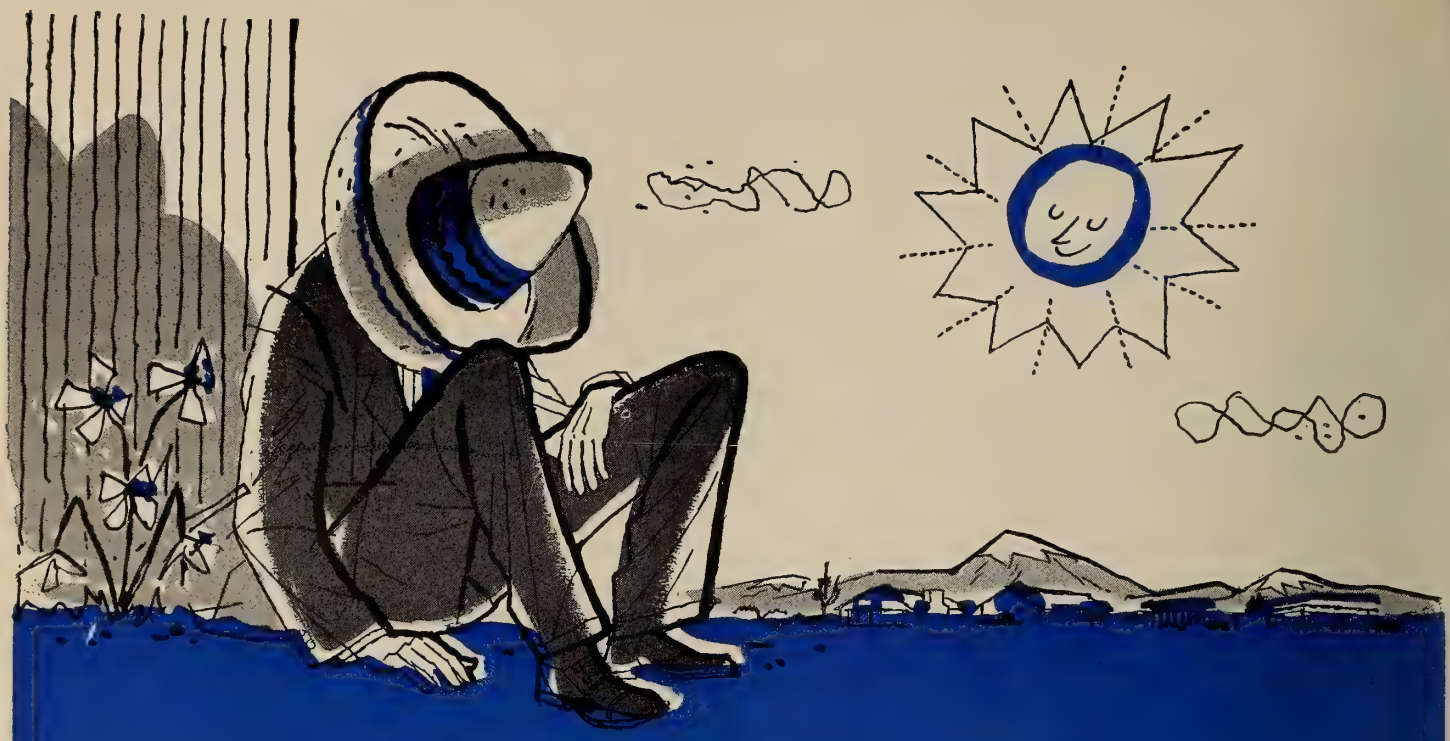
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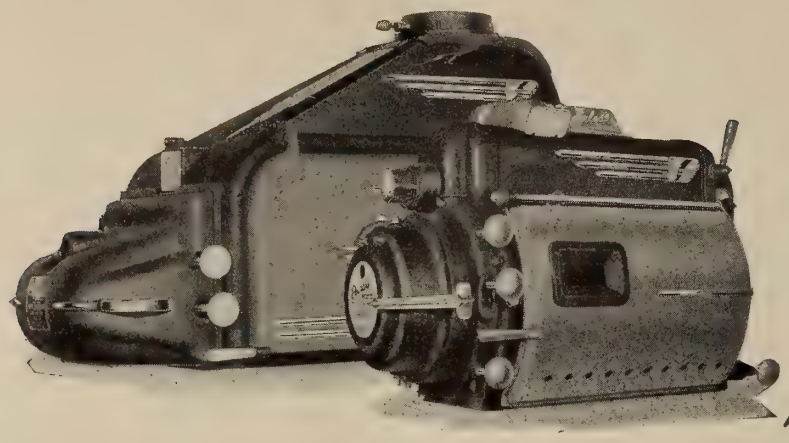
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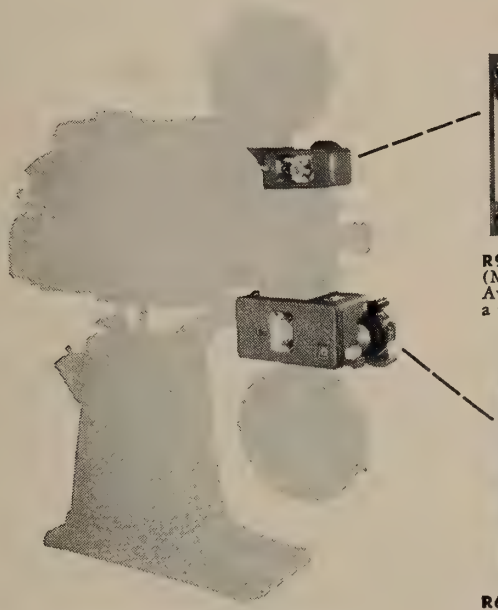
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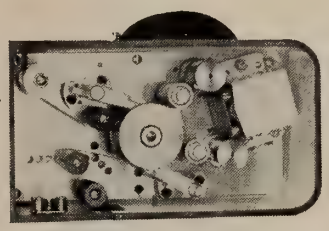
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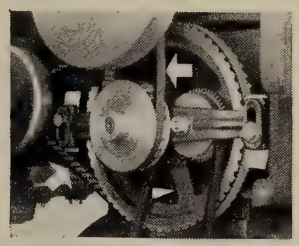
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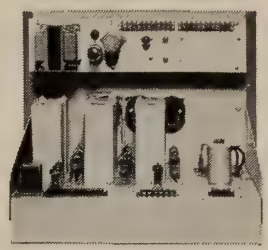
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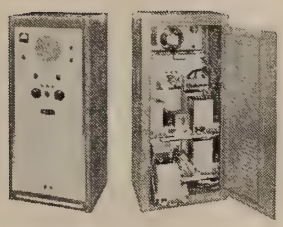
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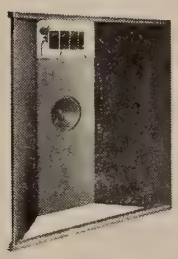
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MONTHLY CHAT

TECHNOLOGY has finally come into its own—but does anybody in a responsible executive position in the motion picture industry render it anything but tux-and-black-tie lip service? These seem very inappropriate words, indeed, at this season of the year, but how much more inappropriate is it that those who are counting their blessings (financially) under the Yuletide tree forget completely those members of the technological branch of the industry (and their families) who have not worked for the past six months because of the unending avarice of those whose primary concerns are bank balances and earnings statements so proudly announced at directors' meetings.

The exacting demands of the various new projection processes was the topic of a recent gabfast by the writer with one of the top executives in the industry. Said he:

"Ours is a touch-and-go business which today is dependent in great measure upon the technological skills of our workers. True, no product is worth a nickel until it is sold; but the major emphasis in this business always has been and, I am afraid, will continue to be placed upon the purely 'selling' angle of a product which would not exist were it not the beneficiary of expert technological attention on both the production and exhibition fronts.

"The technological revolution began when sound movies bowed in 25 or more years ago; but then, resplendent in our isolated eerie as the purveyors of the world's best and least expensive form of entertainment to the masses, we translated this financial triumph *not* into technological research, the lifeblood of any industry from the look-ahead viewpoint, but rather into the ever more gaudy front for the showing of wares that even then, had we known it, were feasting upon their own vitals.

"As far as your fellows (projectionists) are concerned, I am constantly amazed at the unending war being waged by exhibitors to reduce projection room manpower—this in the face of the new and more exacting processes. I receive many letters each month which ask my opinion on this, that and the other aspect of motion picture showings.

"Most of these questions may be answered by the simple statement that the projectionist should stay continually at the operating side of his projector. Why?

"Because in my opinion the correct *presentation* process is the payoff in the industry today—and, also, because I am afraid that in this particular area we have used up all our margin for error!"

Let those who indulge in one-man shift forays stick the foregoing words against their ribs to provide warmth and comfort against the drab days which must inevitably follow this festive season.

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Season's Greetings

VOLUME XXIX DECEMBER 1954 NUMBER 12

Wide-Screen Presentation Magnifies Inherent Projection Defects

By ROBERT A. MITCHELL

The concluding article of two in which are discussed the problems incident to minimizing the exaggeration of inherent projection defects in wide-screen presentations.

PLAY between the star shaft and sprocket will also cause the sprocket to wobble and the picture to jump, hence the warning to projectionists *never* to use sandpaper or other abrasives on the starwheel shaft if a new sprocket seems to be too tight a fit. Oil on the shaft and patience invariably turn the trick.

The 6-cycle type of picture-dancing will occur if the four curved faces of the starwheel are not symmetrical. This slotted wheel, shaped like a Maltese cross, is the most delicate part of a projection mechanism. It is made of hardened chrome-nickel steel and finished to a maximum tolerance of only 0.04 or 0.05 mil in high-quality projectors, and to a somewhat greater tolerance (from 0.1 to 0.2 mil) in less precise machines.

But one of the most common causes of 6-cycle jump in projectors utilizing rotation of the whole intermittent movement for framing is uneven wear of the sprocket teeth. This particular cause of the troublesome 6-cycle dancing of the image is surprisingly common.

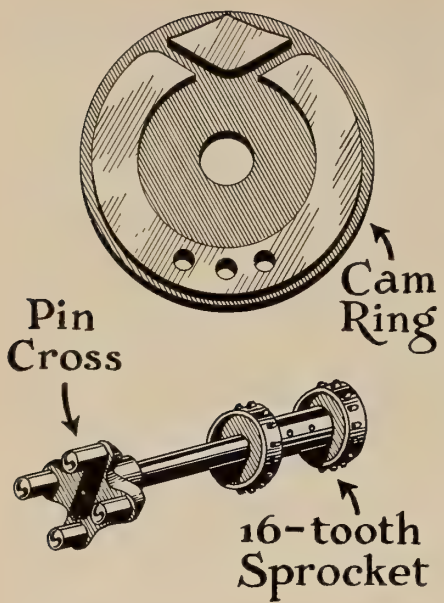
Varying Sprocket Tooth Wear

The wear and tear inflicted by the film on the teeth of the intermittent sprocket varies greatly from tooth to tooth. The teeth that engage the film perforations during *acceleration* of the sprocket are undercut, or notched, the most rapidly, while the teeth that pull the film during *deceleration* of the sprocket wear the most slowly.

And because of obscure factors, which may include slight differences in hardness over the body of the sprocket and accidental initial differences in the spacing of the teeth, the teeth on *one side* of the sprocket circumference wear faster than those on the other.

The worst effects of these unknown factors are usually seen only when the framer is changed from its customary position, as when the picture accidentally goes out of frame during projection, and has to be framed up or down to a different position.

Most projectionists keep the framing knob in its midway position to allow equal latitude in framing the picture up or down on the screen in case of misframe. When projectors having the rotational framing construction are operated for months or years with the framer remaining in this one position, unequal wear of the intermittent-sprocket teeth may



The Powers pin-cross intermittent movement. The diamond portion of the cam-ring imparts a quarter-turn to the pin-cross, after which the roller pins are again engaged and locked in an "at rest" position by the circular portion of the cam-ring. The three small holes in the cam-ring have nothing to do with the action, but they serve as the means by which the ring is strictly and dynamically balanced.

result in 6-cycle picture-jump when the framing position is changed.

Framer Interference

The writer has found that 6-cycle dancing of the picture may appear when the picture is framed either all the way up or all the way down. *The unsteadiness disappears when the framer is returned to its usual midway position* — a fact that rules out such other causes of 6-cycle jump as a warped starshaft, a damaged starwheel, and a lopsided or wobbling sprocket. If these other causes were present, changing the position of the framer would make no difference in the image-dancing. The cure is a new intermittent sprocket; and we do not recommend reversing a sprocket which gives evidence of this peculiar wearing of the teeth. Such a sprocket impresses us as a defective product.

This trouble is not known to occur in projectors such as the Motiograph AA in which rotational relation of the intermittent sprocket to film pull-down is preserved at all times by a framing device which moves the entire intermittent up and down, rather than around an axis, when the framing knob is turned.

The "up-and-down" type of framer requires an intermittent-sprocket shoe separate from the gate-door, while the "rotational" type of framer permits the sprocket-shoe to be attached to an apron at the bottom of the gate-door, a simpler and more convenient construction.

Unequal Sprocket Tooth Wear

Anent unequal wear of the intermittent-sprocket teeth on opposite sides of the sprocket circumference, W. Hecht of the International Projector Corp., manufacturer of Simplex projectors, warns against the use of sprockets of questionable quality.

"Assuming that intermittent sprockets are replaced, difficulty could easily occur if the parts were hardened *after* grinding. Any warping that may result from the hardening could alter the distance between teeth and introduce unsteadiness. On the other hand, Simplex sprockets are hardened *prior* to grinding to make certain that any errors caused by warping are corrected," stated Mr. Hecht.

Certain other American manufacturers of high-quality projection equipment harden their intermittent sprockets after grinding, however, and maintain that the steels from which their sprockets are made do not warp during the case-hardening process. This is a question best decided by experts in the metallurgical and manufacturing fields.

Admissible Picture Jump

According to generally accepted opinion among projection technologists, 6-cycle picture-jump interferes with projection quality to a noticeable extent when sprocket wobble or film mis-registration at the aperture exceeds 0.39 mil (10 microns). This limit represents a picture-movement of about 0.1 inch on a screen 13½ x 18 feet, the aperture being the standard aspect ratio of 1.37/1.

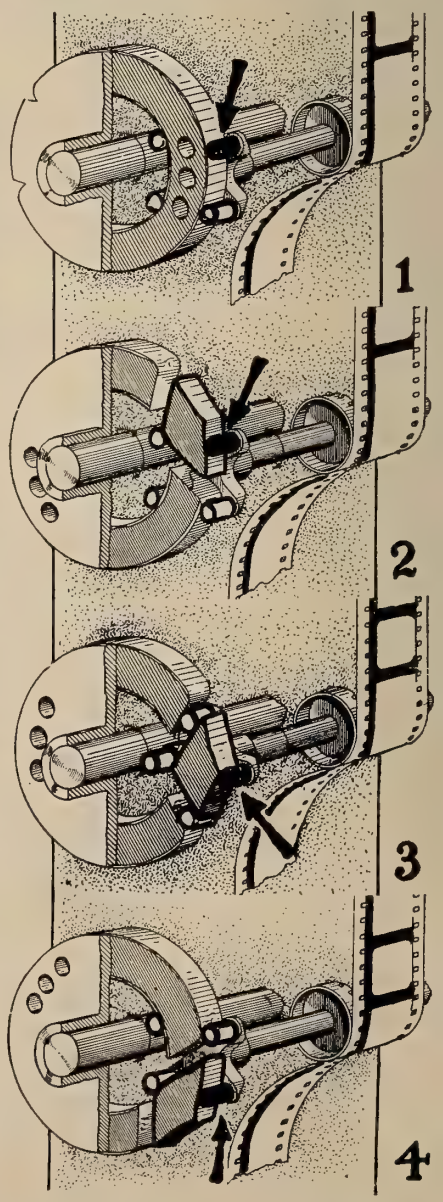
The stated limit of admissible 6-cycle unsteadiness is materially decreased by the wide-screen aspect ratios, as might be expected. To keep picture-jump under the 0.1-inch range on wide screens having a height of 13½ feet, mis-registration of the film must not exceed 0.33 mil (8.28 microns) when the aspect ratio is 1.66/1; 0.30 mil (7.62 microns) when the ratio is 1.85/1; 0.27 mil (6.88 microns) when the ratio is 2/1, or 0.22 mil (5.50 microns) when the ratio is 2.5/1.

It is to be noted that only intermittent units of the highest grade can be depended on to give pictures sufficiently rocksteady for non-anamorphic projection with 1.85/1, 2/1, and 2.5/1 aspect ratios—just one of several reasons why aspect ratios more extreme than 1.66/1 or 1.7/1 should be avoided in non-anamorphic 35-mm projection.

Projectionist's Maintenance Job

Even though the main responsibility for the proper functioning of the intermittent movement clearly rests upon the shoulders of the projector manufacturer, the projectionist is obligated to maintain this critical unit

How the pin-cross intermittent works. One of the four pins is shown in solid black for identification. Follow its action to see how the diamond rotates the cross and attached sprocket which, of course, moves clockwise.



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in the best possible condition. The most accurately made intermittent is subject to maladjustment, and the very hardest sprocket will wear out in the course of time.

Most projectionists dislike the job of changing intermittent sprockets when the intermittent unit is of the type which requires drastic dismantling for the completion of this otherwise simple task. The danger of misadjustment is feared, and unexpected delays in getting the projector in working order again are not too pleasant to contemplate. It is only natural to want to hurry the job; but haste is the chief cause of faulty star-and-cam adjustments.

European projector designers have made sprocket-changing so easy that many projectionists overseas remove the intermittent sprocket daily for routine cleaning of the mechanism. By the use of long starwheel shafts and sturdy inner bearings, the need for clumsy outboard bearings is eliminated; and by fixing the sprocket to its shaft by means of the end-screw and nut-and-bolt methods previously described, troublesome taper pins are also done away with.

With few exceptions, the latest American projectors also utilize constructions which enable the projectionist to remove and replace intermittent sprockets without the need of taking the entire machine apart. But many of the older projectors are still in use, and, accordingly, thousands of projectionists who prefer to do their own sprocket-changing must still go through the complicated ritual required by these old-time projectors.

Sprocket-Changing Procedure

The double-bearing movement used in the Simplex Regular and Super Simplex mechanisms is representative; and since it is necessary to remove the whole intermittent movement from the mechanism, and also to take the movement apart, a definite procedure is to be followed when changing sprockets.

At every stage of the operation the projectionist should have but one thought uppermost in his mind, namely, to guard against damaging the delicate and accurately made parts of the intermittent. And the sprocket, itself, is one of these parts.

The very first thing to do in the case of "Regular," "Super," and similar mechanisms is to open the film gate and remove the "spot" sight-box on the back of the mechanism. Next, the main drive-gear is taken out in order to disengage the machine mechanically from the sound-head. Finally, the mechanism is turned by the shutter-shaft knob to note the "feel" of the mechanism as the intermittent sprocket starts to move. This test should be repeated after the new sprocket has been installed and before the drive-gear is replaced, thus ascertaining whether the movement is properly adjusted for smooth running.

Step-by-Step Plan

Now to get the movement out of the mechanism.

1. Remove intermediate gear-shaft retaining collar. This item is under the lens shield, in line with the upper sprocket and crank-shaft. Turn the mechanism by hand until the set-screw in the collar faces the front of the machine, then loosen this set-screw by inserting a long screwdriver through the hole in the front of the mechanism-case.

2. Loosen the two intermittent-movement clamps (operating side) and push both clamps out of the way toward sprocket-shaft so that they no longer engage the framing cam-ring. Tighten screws lightly to hold clamps in this position.

3. Rotate the movement by means of the framing knob until the intermittent oil-tube (gear side) is in a position to allow the movement to be withdrawn from the gear side.

4. Grasp the intermediate gear in the left hand and the intermittent flywheel in the right hand, and withdraw both from the mechanism.

The movement may now be taken to the workbench for removing the sprocket. Remember that the intermittent casing contains oil, and that this should be drained out by removing the oil-drain screw. To change sprockets:

1. Remove film-stripper from sprocket bearing-bar.

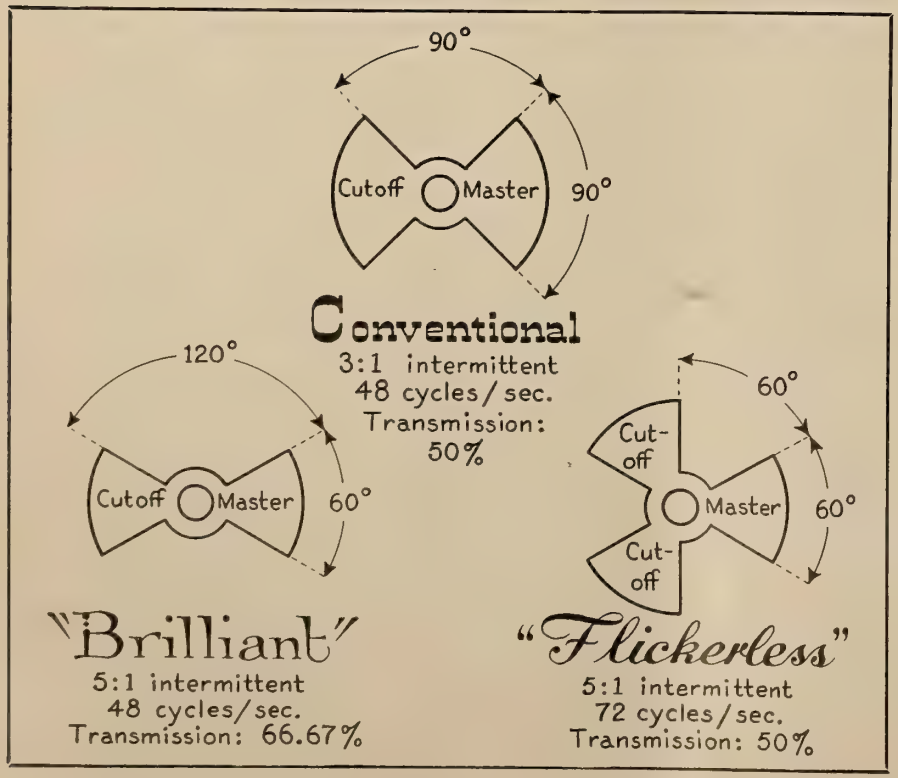
2. Remove the 2 clamping screws and the 3 or 4 retaining screws which hold the cover to the intermittent case. Pull the cover and associated star and sprocket assembly from the case very carefully to avoid scratching the surfaces of the delicate star-wheel. Lay the cover-gasket aside where it will stay clean. Then pour out remaining oil from case.

Note the location of the locating-pin on the case and the corresponding hole in the cover.

3. Remove the collar of the outboard

(Continued on page 47)

The two-fold advantage in shutters which can be used with 5-to-1 intermittent movements. The "Brilliant" shutter has the same periodicity as the conventional shutter—48 cycles per second—but transmits much more light to the screen, making the picture brighter. The "Flickerless" shutter transmits the same amount of light as the conventional one, but its high frequency—72 cycles per second—frees pictures projected at high light levels from annoying shutter-flicker evident with intense light at 48 cycles per second.



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Problems such as this are being solved by the industry. As a means of co-operating in all areas—especially in film selection, film processing and projection—Kodak maintains the Eastman Technical Service for Motion Picture Film. Branches at strategic centers. Inquiries invited.

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VistaVision Process on the Move

By LOREN L. RYDER

Research Director, Paramount Pictures Corporation

Another of the more interesting commentaries at the technological open forum held at the recent joint industry trade show in Chicago is the appended discussion of Paramount's VistaVision process of taking and showing motion pictures. Comment upon and inquiries about this process are invited.

VISTAVISION is a method of improving photographic quality by using larger negative images. We gain these larger images by running 35-mm film through the camera *horizontally*. The exposed area consumes 8 sprocket holes of film and provides an image 2¾ times the area of a standard negative.

Many types of prints can be made from these large VistaVision negatives. Paramount contemplates making only *three* types of prints:

1. Standard Release Prints

These prints will play with improved quality on existing equipment in any theatre anywhere in the world without spending a penny on new equipment.

A further improvement will be available in theatres that are equipped with large screens—and the best results will be obtained with good large screens and good standard projection equipment.

2. Anamorphic Squeezed Prints

These prints will be available for those theatres that desire anamorphic prints and have *variable* anamorphic projection lenses.

3. 2-Frame Horizontal Release Prints

These are the types of prints now being used in the presentation of "White Christmas" at the New York Music Hall and the Los Angeles Warners Beverly Hills Theatre. This type of print is only recommended for theatres with screens ranging from 50 to 150 feet in width.

We can also make prints for curved screens such as Cinerama, or TODD-AO—and we can make anamorphic prints of different ratios. This is a part of the flexibility of the VistaVision system.

Small-Screen Quality the Goal

In our VistaVision work, our No. 1 objective has been to gain the best possible quality for the greatest possible number of theatres *from 35-mm film run through standard projection equipment!* This we feel we have accomplished. It means hundreds of thousands—possibly millions of dollars—savings to the theatres throughout the world.

At the Paramount studios, it has been apparent that the picture quality in very large theatres, and on very large screens, is suffering by comparison with the picture quality in smaller theatres on smaller screens. I believe this applies to all processes. I know that the comparison becomes more apparent as the film quality is improved.

Our No. 2 objective is to provide the same high quality for large theatres as we supply to the smaller theatres. This is the reason for the double-frame film and double-frame projection for those theatres that desire it. It is also our opinion that double-frame projection can be of real help to drive-ins.

Choice of Film Size

We shall make tests of double-frame projection in drive-ins and will report our findings to the industry at large. Data indicates that by using the double-frame projector and projecting the first show on a smaller screen, it should be possible to open a drive-in theatre ½ hour to one hour earlier. Early patrons would be advised to locate close to the screen for best viewing of the smaller picture.

I have also been asked: "Why 35-mm film? Why not 70-mm, 65-mm, 50-mm film?" "Why did we at Paramount sell the 65-mm camera and projection equipment that we owned?"

The answer is simple and straightforward: we can project a better picture by the horizontal method.

The bottleneck of motion picture quality, and the greatest shortcoming in motion picture presentation is in projection. This applies to all processes: Cinerama, CinemaScope, the so-called standard projection, and VistaVision. I should also expect that it will apply to the Todd-AO process. This is not a condemnation of projection equipment, or the operation of this equipment, it is a statement of fact. We are now asking old-style *equipment* to do a bigger and more precise job.

Film Buckle Serious Problem

Most trouble is in film buckle, or pin-cushioning of the film in the projection gate. This buckle and pin-cushioning is caused by the rapid heating of the film by the projection arc. It is a progressive effect that is changing throughout the cycle of screen illumination making it such that film focusing is at present only a compromise. It is interesting to know that this effect does not exist on 8-mm film. It is just apparent in the projection of 16-mm film; it is bad on 35-mm film, and it is terrible on 65-mm film.

In standard 35-mm projection, the distance between the film supports is one inch. In the case of 65-mm film, this distance is increased to two inches. In the VistaVision process with hori-

The Story, "the Play" Is Still the Thing

It would seem that the proper time to take care of one's health is while healthy. By the same token, when we are prosperous, it is the time for prudence. There is no question but that the wide-screen in all its aspects is theatrical and dramatic and has stimulated the box-office. However, if we are not careful we will start making pictures *merely to fit the frame.*

Audiences will quickly tire of seeing the same picture over and over again under another title. We can very readily decide that unless we have thousands of extras and sets 20 mile long, we are not making today's movies. We need to get back to the fundamental principle of letting the story and *the story alone* predominate. Variety has always been an important word in entertainment.

DON HARTMAN

Production Department, Paramount Pictures Corp.

zontal projection, we retain the advantage of the one-inch support and, at the same time, gain the desired increase in picture area.

We at Paramount often hear this saying: that if the larger picture image of VistaVision is better than the standard image size, wouldn't a still larger image be even better?

Film Image, Depth of Focus

The answer is: No! As we increase the size of the picture image, we increase the picture sharpness in the plane of lens focus—*but* the increment of advantage from this increase diminishes very rapidly after the image size has arrived at the point where the picture quality is better than that which can be seen by the eye. As the picture size increases, the visible grain diminishes, but here, too, the increment of improvement diminishes very rapidly, after the grain size has been reduced to smaller than that which can be seen by the eye.

As the size of the image increases, the depth of the field of the lenses (depth of focus) diminishes. Therefore, the larger the negative image, the greater the tendency for the foreground and background to be out of focus.

In the VistaVision process we have increased the size of the negative image to the optimum point of picture improvement. If our computations are correct, all other systems will trend toward the Paramount image size.

Projection the Bottle-Neck?

Earlier in this discussion we mentioned the projection bottle-neck. Now we say, what are the reasons for this bottle-neck, and what can be done to improve this situation? We must first keep in mind that the old projectors were pretty adequate for the old photography, on the old postage-stamp screens. As the quality improves, especially as demonstrated by the VistaVision process, and as the screen size increases, new thinking and greater precision must be incorporated in these equipments.

The projection optics are mechanically lined up with the projection gate. This alignment does not comply with the offset picture image on the curved screen. This is the reason why

(Continued on page 46)

Air Blast, Water-Cooling Joined in New Conversion Unit for Simplex X-L

THE use of bigger screens in indoor and drive-in theatres presents in larger or more visible form any defects that may exist in the picture or the projection technique. One of the defects which has been known to exist is the slight loss in sharpness, caused by variations in the position of the film plane in the picture gate as the film buckles under the heating effect of the light passing through it.

Because of the larger screen, the actual light values have been increased thus causing the magnitude of the buckling effect to increase. Short-focal-length lenses, sometimes used to obtain the larger pictures, place even more stringent requirements on film positioning.

Conversion Unit for Simplex X-L

All these factors make it more important to use every technique known which will improve the stability of the film in the gate. One very promising technique, which the writer discussed in a previous issue of IP,† involves the use of air blown against the two sides of the film to accomplish the dual purpose of carrying the heat away from the film and constraining the film to remain in an essentially constant position during the projection cycle.

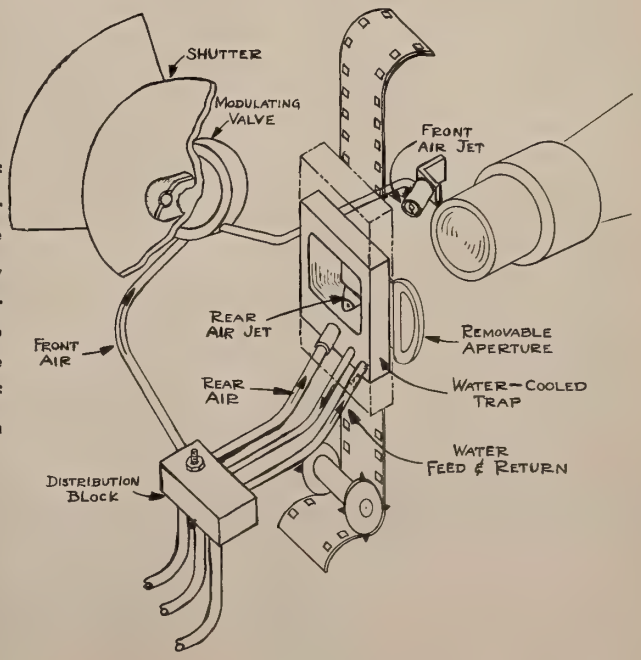
The work reported on earlier has been carried further, and there is now a conversion design for Simplex X-L projectors. In this conversion design we have three principal features:

First, is a continuous stream of air that blows against the film on the arc-lamp side. This air stream carries away the majority of the heat, and it also exerts a force on the film towards the lens in opposition to the usual direction of buckle. This would result in a reduction of the magnitude of the buckle observed, but it would not prevent a considerable variation in the *instantaneous* buckle during the exposure period.

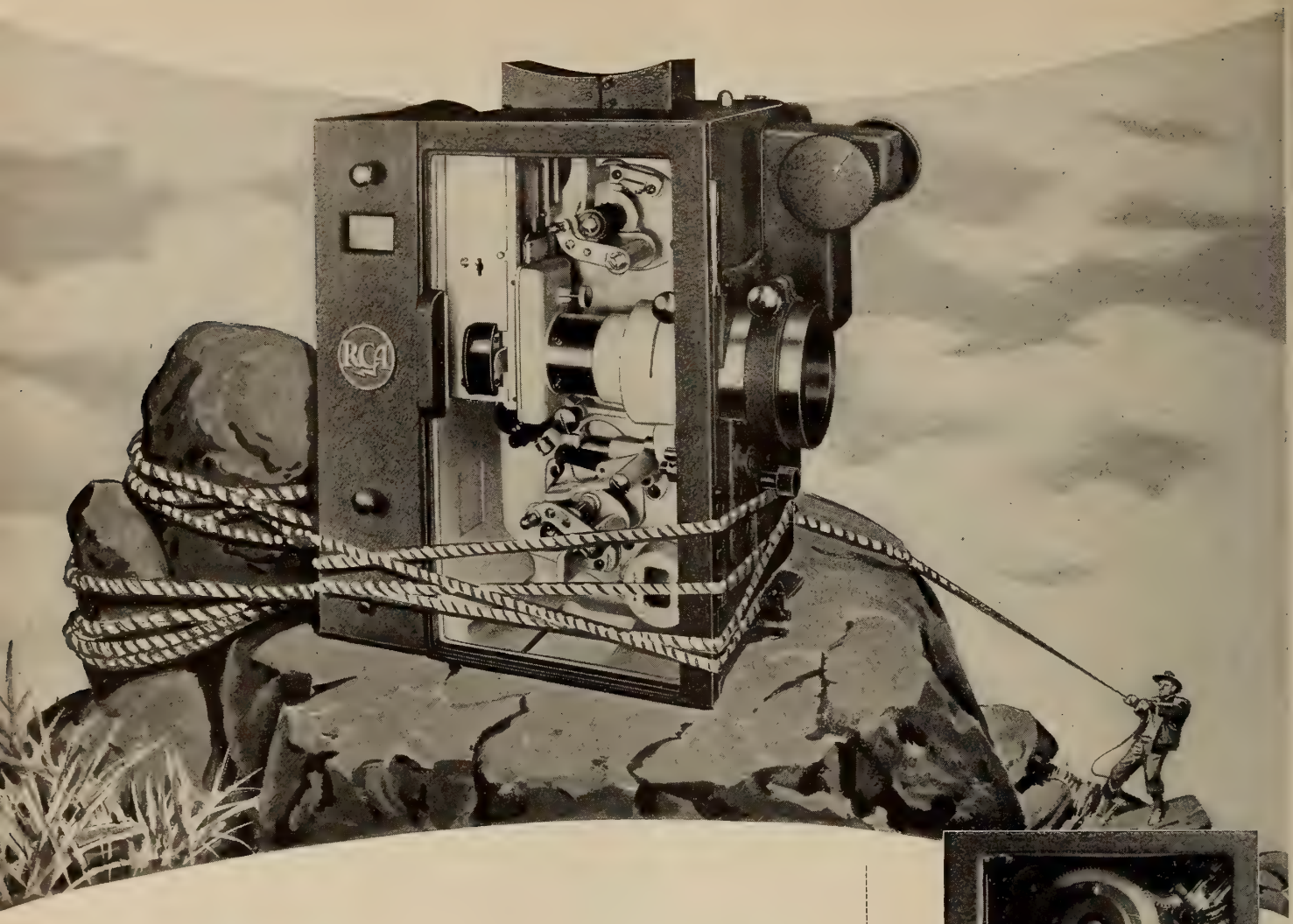
Second, a modulated blast of air, directed against the lens side of the film, which minimizes this variation in instantaneous buckle.

Third, a water-cooled film trap which carries heat away from all the metal parts surrounding the aperture. Modern arclamps with high light outputs and high-speed optical systems have a light-cone angle which makes the shielding of stray light by means of heat baffles very difficult. The water jacket absorbs the stray light and also shields and cools the rear air nozzle.—WILLIAM BORBERG, Chief Mechanical Design Engineer, General Precision Laboratory, Inc.

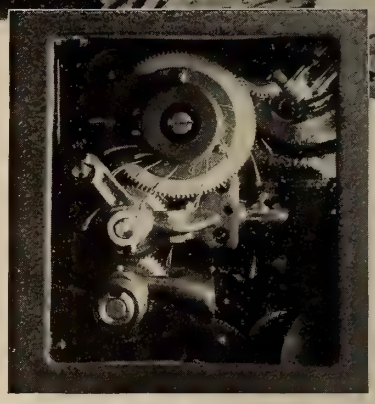
† "Modulated Air Blast for Reducing Film Buckle;" IP for October, 1952, p. 14.



Graphical representation of the new air-blast, water-cooling attachment for the Simplex X-L projector, which was designed following exhaustive tests to alleviate in great measure the enervating effects of high-intensity arc heat upon the film.



New film processes demand the "Rock-Steady" projection of an RCA "100"



AUTOMATIC LUBRICATION, famed long-life feature of the RCA "100" Projector, assures dependable, high-quality performance in drive-ins and indoor houses alike. Gears, shafts, bearings—all moving parts are showered continuously with oil for cool, frictionless operation. Dustproof gear cover keeps oil inside, dirt outside.

Screen images hold steady as a rock when any new-process film runs through an RCA "100" Projector. RCA, the name that's outstanding in projection *and* sound, engineers this superb projector with special three-way close tolerances. In the precision gear train, in all moving parts, in heavy intermittent movements . . . these close tolerances mean steady projection that's always dependable.

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Flood-lighting in the film compartment of the RCA "100" assures fast, accurate film threading. Full view glass doors on both film and gear compartments allow an easy check on vital mechanism while projector is in action. And the extra light delivered by an RCA "100" gives all the sharp picture definition called for by larger, wider screens.

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The History of Studio Lighting†

The use of artificial light in motion picture production has followed a number of recurring cycles. Usually the carbon arc has been king. However, it sometimes has been replaced in dominance by tungsten. The following article traces the story of studio lighting from its inception.

By CHARLES W. HANDLEY

National Carbon Co.

THE ENERGY with which some people have attempted to reduce motion-picture set lighting to a strictly mechanical function indicates that the importance of light in motion-picture photography was probably not fully appreciated even by some of the people who depended upon the control of light for their livelihood.

A natural desire on the part of production units to simplify lighting to the extent of a pushbutton formula and to arrive at a Utopian position where pictures are made on a production-line basis has influenced historical trends in motion-picture set lighting. Some of these shifts have been responsible for major improvements in picture quality, while others, which were based on supposed economic gains alone, have often forced compromises with dramatic effect to the serious detriment of the finished product.

Dramatic Lighting

The film technician may desire a negative showing some detail in all shadow and highlight areas with most of the density range on the straight-line portion of the gamma curve. It is this desire for his own limited goal that has often encouraged him to extol the merits of flat light. The art director may desire sufficient overall density to insure an appreciation of the beauty of his set. But the director and cinematographer may be striving for a dramatic effect that fails to meet the desired requirements of either film technician or art director, yet does achieve the end result in that particular shot of affecting the senses of the theater patron in a manner which will forward the total desired effect of the story.

In the beginning, little thought was given to anything except a sufficient amount of light to provide exposure. Novelty effect took the place of dramatic effect. The motion picture was a magic lantern with movement, "just a passing fancy."

It is true that as early as the turn of the century, Thomas Edison built an experimental motion-picture stage which was mounted on a turntable so it could be rotated to follow the changing relative location of the sun. The infant industry, however, was in no position to try any costly experiments. As a matter of fact, where the cameraman helped to write the script, build the sets and even double in brass for all types of production work, there was little time for artistic expression.

Fortunately, as the motion-picture industry began to expand, there was a considerable number of people who saw the possibilities of the medium as a means for dramatic effect and the cameraman was one of the major leaders toward creating dramatic results that would entertain people by affecting them emotionally.

Only Sunlight Available

At that time in motion-picture production, sunlight was the only available light source and sets were photographed on open stages with muslin diffusers mounted on wires so they



FIG. 1. A Paramount picture photographed in 1939. Sunlight is the light source. Note the use of reflectors and circular scrim protecting some of the principals from overly strong shadow effects. Street set is rigged with canvas roof that may be pulled over to make closed set, if artificial light is used.

† Journal of the SMPTE, October, 1954.

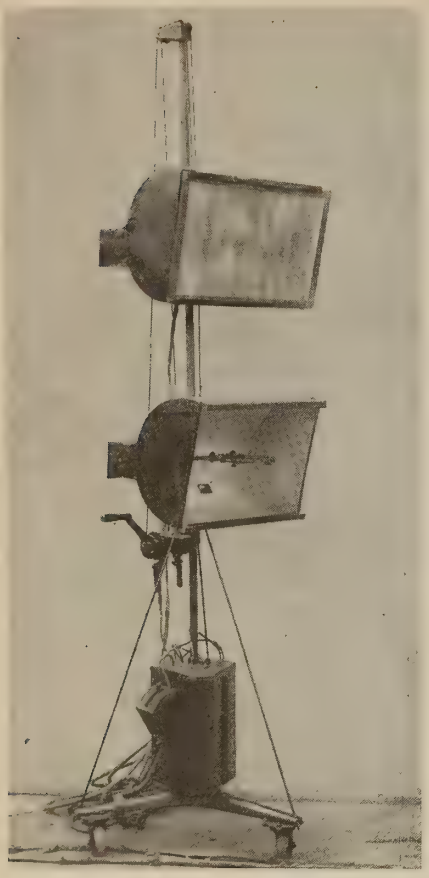


FIG. 2. An early type of solenoid feed carbon-arc floodlamp.

could be adjusted to control the light. Various types of reflectors were also used to redirect the rays from the sun and avoid heavy shadows on the faces of the characters and throughout the set. A wide assortment of translucent and opaque objects are still in general use to diffuse and control light (Fig. 1).

Color Quality To Fore

Because pictures were made in black-and-white, the question of color quality was not so important as it is today. However, the cameraman was handicapped by wide variations in intensity and position of his sunlight source throughout the day, and during inclement weather he was unable to work at all.

As a natural outgrowth of this situation, glass stages similar to large greenhouses were constructed and diffusers were installed as on the open stages. The reason for the glass stage was to permit the picture companies to operate during inclement weather; however, the advent of artificial lighting at about the same period made them obsolete and they were seldom used in the manner for which they were originally designed.

The advantages of working under artificial light were so great that most of the sets built inside of the glass stages were covered over with canvas, or other means were employed to exclude the natural light. Later, the glass panels were painted black so the natural light could not interfere with the controllable artificial illumination being used.

In the earlier serious attempts at set lighting the cameraman worked with old-type, street-lighting carbon arcs and banks of Cooper-Hewitt mercury tubes placed directly overhead and at angles in an attempt to obtain a flat, diffused light all over the set. Cooper-Hewitt mercury lamps were installed in the Biograph Studios, New York, as early as 1905. Overall exposure requirements, lack of adequate equipment and economics made anything but flat lighting difficult, if not impossible, to attain.

Powerful Lights Required

It was known by the cameramen that added interest, improved perspective, increased illusion of depth and much greater dramatic effect would be obtained if they could skillfully utilize powerful light sources that would give them the effect of a one-source lighting such as could be obtained from the sun under ideal conditions, but the industry had not yet attained the position where such specialized equipment could be properly designed and made.

The time finally arrived when the public had accepted the silent pictures and fortunes were being made in production. This brought competition, which in turn opened the door for the cameraman to take some chances, to try anything he could get his hands on, to use his creative ability without fear of sudden replacement by a penny-wise management. In 1912, white flame carbon arcs replaced the low-intensity enclosed arcs at Biograph.

One of the cameraman's first demands was for a controllable light source that would give him twice the power and twice the penetration capacity of anything he had. His only source of equipment was to follow precedent and adapt from other fields as had been done with the street-lighting carbon arcs and the Cooper-Hewitt mercury banks.

Origin of Term "Klieg Light"

Carbon-arc floodlamps, better adapted to floor lighting than the other equipment, were obtained from the graphic-arts and still-photographic fields (Fig. 2). Carbon-arc spotlamps were purchased from the theater-projection and stage-lighting fields. Such lighting equipment companies as M. J. Wohl & Co. and Kliegl Bros., of New York, turned their attention to motion-picture studio lighting equipment. It was from the name Kliegl that the "Klieg-light" originated. Even the military searchlight was adapted for use where a greater amount of light was needed (Fig. 3).

The status of the cameraman improved with his increased ability, from both the equipment and economic angle, to show what could be done with light and his title was changed to Cinematographer, or Director of Photography.

Because they could be placed where the carbon arc could not, and because

(Continued on page 40)

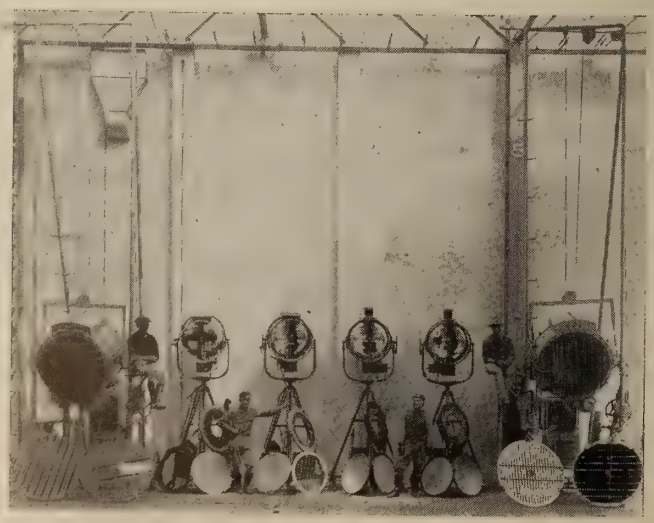


FIG. 3. "Sunlight" arc lamps — 24- and 36-inch — popular during the 1920's and early 1930's. This equipment was adapted from the military searchlight.



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This Matter of Correct Screen Surfaces

One of the more interesting expositions at the recent giant trade show in Chicago was the offering by Leonard Satz, Raytone Screen Corp., excerpts from which are appended hereto.



Leonard Satz

THE problems of the screen manufacturers are closely interlaced with those of the lamp and optical manufacturers. More and more light is the cry today. Wide screens and various wide-screen techniques require more light because the available illumination is spread over a large area, thus the screen tends to have less brightness. The ways in which we can make more light available are:

1. To increase the output of the light source.
2. Increase the brightness of the screen.
3. A combination of both 1 and 2.
4. Improved optical designs — not only in the lens or the method of presentation — but also in the arclamp and projector.

Theory—Practicality Clash

We all know that, theoretically, faster lenses can help this problem, but if the light from the arc is not *correctly directed* through the projector aperture, the faster lens cannot be used to best advantage. Another thing to remember is that all things are not obtainable in optics. The faster the lens, the more likely there will be poor definition at the extreme sides when short focal lenses are used.

The past year has proven one thing in particular to me as a screen manufacturer: the great majority of exhibitors demand a metallic screen that has perfect uniformity of surface *above all else*. Brightness and light distribution must also be provided in good balance.

Lately it has been suggested by some that white screens are good enough for wide screen techniques, that they give better distribution of light to the sides. Certainly, they diffuse light efficiently — not only to the sides, but to the ceiling and floor as well. To assert that such a screen should be used for every type of projection is illogical.

Such a surface puts a very large percentage of its reflected light where it is either difficult to seat patrons, such as the extreme front sides, or impossible to seat them, such as on the ceiling or on the stage floor. It follows, therefore, that such reflected light is totally wasted.

Varying Conditions Requisites

I do not mean to infer that nothing can be done about it. The equipment manufacturers are constantly striving to improve every facet of motion picture theatre projection and sound. There is a correct screen and correct equipment for every theatre. Situations will vary, of course, but most of the answers are available. All factors applicable to a given situation must be weighed carefully *before* the purchase and installation of the equipment.

The writer suggests the use as a guide of the recommendations and reports of the SMPTE and the Motion Picture Research Council. A few years back, a survey conducted by the SMPTE indicated that the majority of theatres in this country were sub-standard and did not have 9 to 14 foot-lamberts of reflected light on their screens (mostly white screens).

The average theatre today can meet those standards *if* it uses a high-gain metallic screen and an adequate light source with wide-angle techniques. It does not meet these standards on a white sheet unless the light output has been greatly increased in the projection room.

Another point worth remembering: assuming we have an adequate given amount of light at the arc, say, 70 amperes, a 40-foot-wide metallic screen *can* reflect 9 to 14 foot-lamberts back to the largest seating area of the theatre, represented by a quadrant of

Reflection vs. Refraction

While with spherical mirrors light, is reflected according to the laws of reflection to an approximate focus (we shall see later why the focus is never exactly a point) lenses make use of a different property of glass, called *refraction.*

Refraction simply means *bending.* Whenever a ray of light passes at an angle from one material into another of different density—air to glass, glass to air, water to air are the three most common examples—it is bent or refracted.

Here is a simple way of understanding what happens. Suppose a number of soldiers are marching in line abreast, and they step off a hard smooth surface the edge of which is at an angle to the line of march, on to some sticky muddy ground (Fig. 1). As each man steps off into the mud he will be slowed down, and gradually the right-hand men will get more and more behind (sketch *b*). Eventually the line of soldiers will be marching at a different angle.

Passage of Light Depicted

The same thing happens with light. A ray of light which has been passing freely through air suddenly comes to the surface of a block of glass through which it cannot move so easily. If this glass surface is at an angle to the direction of the ray (Fig. 2), then the ray will be bent. If our piece of glass is flat (*a* in Fig. 2) it will straighten out again after it has left the glass. But if the glass is in the form of a

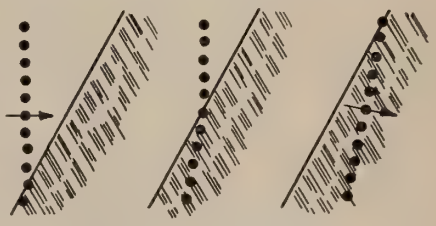
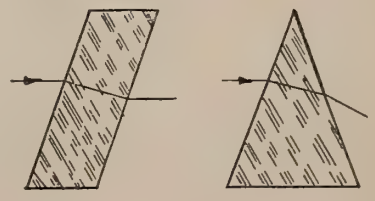


FIGURE 1



A B

FIGURE 2

prism, there will be a second bending or refraction when the light reaches the farther side of the glass, just as there would be if our line of soldiers came to the end of the patch of mud. When the light emerges from the prism it will be travelling in a different direction (*b* in Fig. 2).

R. H. CRICKS, *Ideal Kinema.*

60° from the center of the screen. True, beyond this 60° quadrant — on either side — the reflectance will fall below the 9-foot-lambert minimum; *but* the same arclamps could not return any more than 7 foot-lamberts (probobly less) from the *center* of a 40-foot-wide white screen, and less at the sides.

Thus, the comparison at the sides of the theatre is equal and unsatisfactory with either type — but far superior with the metallic screen for the greatest number of desirable seats.

Curvature of the Screen

Now, a word about curving the creen. Knowing the reflectance characteristics of our screen . . . which are typical of certain others . . . we recommend a curvature equal to the radius of the throw. It improves the light distribution at the sides of the average auditorium. We also recommend, in balcony houses especially, tilting the screen backward slightly. This will balance the reflection of light between the balcony and orchestra.

The drive-in theatre problem is essentially the same as the indoor theatre. Results, however, are mostly sub-standard—something on the order of 4 foot-lamberts of reflected light because of the very large screen size. But because the screen area is so very large, we accept the results. The human eye is a remarkable optical instrument: visual acuity, or the ability of the eye to perceive details, improves as the size of the image increases.

More light is needed. More light will be made available as the equipment industry progresses. Another year I am certain, will bring about definite improvement in equipment and procedure.

Herewith an interesting question from the floor, and the answer thereto by Mr. Satz.

QUESTION: Do you recommend that I curve my drive-in screen tower?

ANSWER: Yes, I do. For the reason that both indoors and out a specular or semi-specular type of surface will give better distribution of light at the sides of the arena or auditorium.

Curving is not for the purpose of creating an illusion of depth. It is possible that one of our optical experts might give us an opinion on curving a screen as far as optics are concerned. It is possible that they may disagree with the theory of curving a screen.

It is my opinion, and in this regard I agree with the remarks just made by Mr. Sponable, (research director for 20th Century-Fox), that screens should be curved *indoors and out* on a radius equal to that of the projection distance. Improved screen surfaces of the future will probably require a slight curvature.

Kit Modernizes Simplex E-7, Super Heads

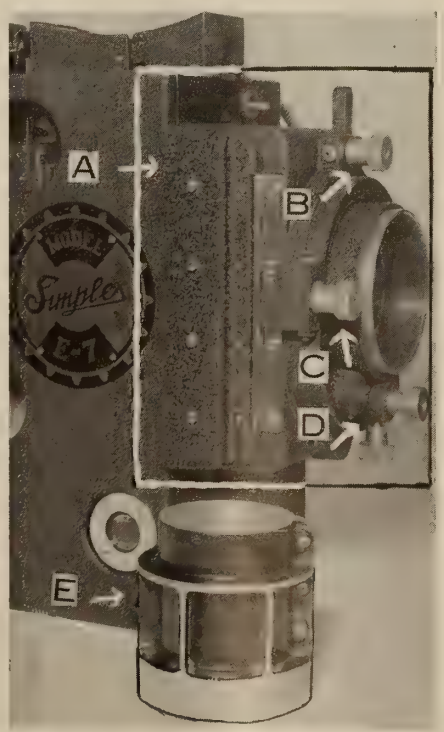
A reasonably-priced conversion kit to better adapt the Simplex E-7 and Super projector heads *only* to the new processes has been marketed by the Bizzelle Cinema Supply Co., 420 West 45th St., New York City. The combination face plate and lens carriage provided in the kit makes it possible for these mechanisms to take 4-inch lenses, and also provides for horizontal and vertical adjustments of the lens carriage so that the procedure for switching from CinemaScope to non-anamorphic projection is greatly simplified.

According to C. P. O'Grady, vice-president of Bizzelle Cinema Supply, the modification device, known as the Cinecenter, which is contained in the kit. can be installed either by a serviceman or by the projectionist himself. It is only necessary to follow simple directions for removing the front cover and the standard 2 25/32-inch lens carriage from the mechanism. Then the new attachment can be installed with a screwdriver.

Simple Installation Operation

The accompanying illustration shows the attachment mounted on an E-7 projector head. Arrow A points to the entire Cinecenter attachment. Arrows B and C point to the vertical and horizontal adjustment locks for changing the position of the lens. Arrow D shows the focusing knob and lock of the new lens carriage. Arrow E at the bottom points to an extra adapter that permits the projectionist to use a small diameter lens in the larger carriage whenever necessary.

While all makes and focal lengths of 2 25/32-inch diameter lens can be used with the extra adapter provided, not all four-inch diameter lenses can be used because of the limitation in the distance between the optical center and center frame of the E-7 and Super. The Kollmorgen four-inch lens will fit because the rear of this lens narrows in a series of steps allowing it to pass the obstruction. In addition to its other features, the Cinecenter is said to prevent vignetting which sometimes occurs when extremely short focus lenses are mounted in older projector heads and part of the beam is blocked by the mechanism.



The Cinecenter attachment is shown above enclosed within the black-and-white rectangle and installed on a Simplex E-7 mechanism. A four-inch Kollmorgen lens is mounted in the Cinecenter carriage. Features indicated by arrows are explained in accompanying story.

2,010-Car Drive-In Planned

Despite efforts by the Hartford, Conn., city council to halt plans for the construction of what is described as the world's largest drive-in (2,010 cars) in that area, a green light has been given.

Both a majority of the council and the city's planning commissioner were unable to find any legal basis for halting the venture so that the area could be used for a more tax-productive industrial development. The prospective builder of the giant drive-in is A. J. Bronstein, who operates other drive-ins in Connecticut.

Local Taxes Hurt Theatres

Local taxes imposed on the nation's theatres are draining off a minimum of $36,000,000 annually, according to a report from the Committee of Motion Picture Organizations.

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The arc is stabilized by a stream of air which maintains a prescribed system of ventilation of the area surrounding the arc. This air jet prevents the hot tail flame of the arc from reaching the reflector, supplies enough oxygen so that no black soot is produced, and keeps white soot from collecting on the reflector in such quantity as to absorb heat which would cause breakage.

Unit construction permits easy removal of the elements for inspection in servicing.

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The marked increase in theatre attendance which VistaVision has already contributed to the economic welfare of our industry can be extended only thru the best efforts of producers, exhibitors and projectionists working together toward its perfect presentation to the public.

This concluding article of two sets forth in down-to-earth fashion the problems confronting the optical designer in computing, making and delivering a product which, hemmed in by all the normal restrictions of the projection process, will deliver to the screen the sum total of entertainment value contained in the print which is delivered to the theatre for ultimate consumption.

Elements of Optical Condensing Systems

By A. E. MURRAY
Scientific Bureau
Bausch & Lomb Optical Co.

AN attempt is often made in motion picture projectors to reduce the amount of "spill light" at the long sides of the gate by using a cyclindrical surface with horizontal axis on one of the condensers.

With the proper distribution of power in the condensing system, this will produce an elliptical spot with the minimum spill of light. With a diffusing medium such as film in the gate, this technique leads to greater uniformity as well as more useful flux flowing through the gate. Optically, the round arc image is flattened the better to fit the gate, and two real images are produced of the arc (images elliptical in shape) at right angles to one another and differently situated on the axis.

Theoretically, with point sources and with perfect condensers, this would mean that since only one source image could be placed at the gate, the other image falling either before or behind the gate could not match the *f* number of the objective, thus light would be either wasted or the full potentialities of the objective would not be used. The condensers obviously have two different *f* numbers in the two meridians.

Condenser Design Requisites

In practice, however, arc craters are of finite size, and because the film is diffusing and thus can even out the *f* number discrepancy—and more cogently, because no system is perfect—spherical aberration introduces enough complication that a real gain seems to be found.

The imagery demanded of condensers is not of the same order of magnitude as that required of photographic or projection objectives, but still the requirement that they deliver the maximum flux in use calls for careful design. Condensers are not required to image very large angular fields, *i.e.*, they must work close to the axis, so it is possible to achieve satisfactory performance with relatively few surfaces, and the aberrations of the oblique pencils have relatively little weight in their design.

Spherical Aberration Effects

It is clear that in the case of a point source, with either arrangement of source image, in the gate or in the projection lens, spherical aberration in the condensers leads to impaired efficiency. Spherical aberration is that behavior of centered systems, not necessarily consisting of spherical surfaces, characterized by differing focal points for the various zones of the system. Those rays traveling close to the axis will find their focal point at a different position on the axis in the image space than the rays which are incident near the margin of the system, or points between.

If the paraxial (region near the axis) focus of the condensers is placed in the gate or in the lens, it is easy to see that the rays from the margin are likely to miss the projection lens, thus wasting in severe cases some of the periphery of the condensers. On the other hand, if the primary thought is given to the placement of the peripheral marginal or zonal image, the paraxial image may fall too far out of line to be effective and cause intolerable lack of uniformity.

How Light Is Wasted

At its worst, spherical aberration with point sources produces an indeterminate region along the axis through which the source is imaged by the various zones of the system, together with unevenness of illumination and waste of useful light.

The same objections apply even more cogently to sources of finite size. Each point of the image is afflicted, and instead of a clear-cut, well-defined image it is either sharp with a large amount of general haze spread far outside the boundaries, or very fuzzy and ill-defined with poor evenness of illumination. In either case, a limit of utility is soon reached.

Spherical aberration is a function of the aperture of a system, increasing rapidly as it becomes greater. It is this spherical aberration which sets a limit to the solid angle of the collected cone of flux in a condenser, for always the system must be usable.

Spherical surfaces cannot deliver efficiently the quality and quantity of flux required by modern objectives, so resort is had to those surfaces which

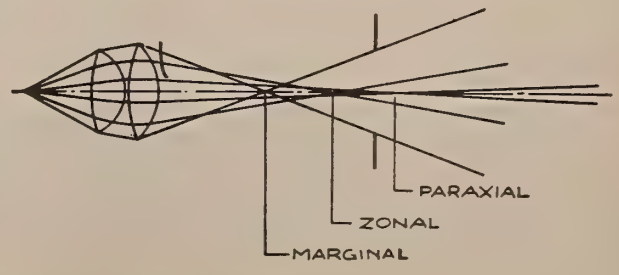


FIGURE 7.
Spherical correction. This illustrates simple undercorrection wherein the marginal and zonal foci are closer to the lens than the paraxial.

will permit higher solid angles and better definition of the source in motion picture projection with fast lenses.

A single spherical surface, and in general a simple system of such surfaces, acts as though it possessed too much refractive power toward its margins, or too little close to the axis. This might be remedied by the expedient of diminishing the curvature of the zones in just sufficient amounts to compensate the excess power. Mathematically, this is easy to do, the surfaces required in the general case having been worked out by Rene Descartes some 350 years ago.

These surfaces are in general not practical or economical, and as far as the practicing optical engineer is concerned are but curiosities, with the exception of the elliptical mirror to be considered in its place.

Combatting Spherical Aberration

In general, each pair of conjugates, or object and image distances from a given surface, requires a different Cartesian surface, both in reflection and refraction. Fortunately, there is an approximation in refraction which in

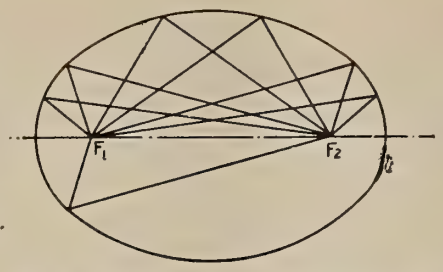


FIG. 8. Illustrating the focal property of the ellipse. Any fan of rays, of arbitrary solid angle with apex at one focus, is imaged at the other focus with no spherical aberration. This is true only for point sources.

combination with spherical surfaces will provide a greatly diminished spherical aberration. These parabolic surfaces find wide application in condensers.

The techniques for producing parabolic surfaces in the shop are comparatively simple, and they can be produced in large numbers. While such surfaces are not always the answer to condenser problems, from practical considerations their properties are used in answer to specifications where spherical surfaces could not perform.

Because of the loss of curvature toward the periphery, and thus diminished power, the spherical aberration in refraction of parabolic surfaces is considerably improved over spherical surfaces of equivalent power, even at finite conjugates. For this reason, considerably better light-gathering power is possible with such surfaces.

If we were confined to spherical surfaces exclusively, condensing systems would be as complex as projection objectives, and many more surfaces would have to be used, with the consequent loss in transmission.

Aspheric Condensers Promising

Aspheric condensers have been exclusively parabolic for the aforementioned practical reasons, but there is nothing to prevent the use of other aspheric forms, if required by physical considerations. Indeed, with the skills gained in the production of such outlandish surfaces as Schmidt corrector plates, it is not at all unlikely that the next direction of advance in condenser design may be toward aspheric surfaces designed specifically for a given application. Before this can happen, however, there will have to be a sufficiently large demand to justify

Holiday Greetings

It has been our privilege throughout many years to be intimately associated with a group of craftsmen who through their inclusive knowledge of the exacting demands of showmanship have realized the full potentialities of the fine projection equipment we have provided. The phrase "Better Projection Pays" was never better demonstrated than in the close technical and fraternal relationship which has existed between our groups these many years.

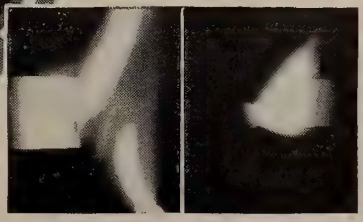
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both development and production costs, for such surfaces will have limited use.

So far our discussion has been limited implicitly to condensing systems comprised of lenses—refractive systems. Reflective systems comprise one of the largest and most important groups of condensers in use today. Mirror systems have a great advantage in weight and in the fact that potentially, at least, the reflective and absorptive losses are less, though this factor is minimized by the fact that in arc lamps and single mirror surface is apt to tarnish and to need replacement rather frequently.

Elliptical Mirror Properties

A very curious property of an ellipsoid of revolution (the solid figure created by the rotation of an ellipse about one of its axes) is its ability to bring to a focus *all* the rays emanating from a point at one of foci of the ellipse. The two geometric foci of an ellipse in reflection are optically conjugate, and a point source at one is imaged at the other by arbitrarily wide cones of light, and *without spherical aberration.*

This property of elliptical mirrors is very useful, for they can be made to collect solid angles much greater than possible with lenses, and to image the source, which must be comparatively small, without loss of light accurately where needed. This useful characteristic of elliptical mirrors applies only to the geometric foci and to small regions about the axis, so they are employed only with arc sources, where they collect more flux, but are less flexible than lens condensers.

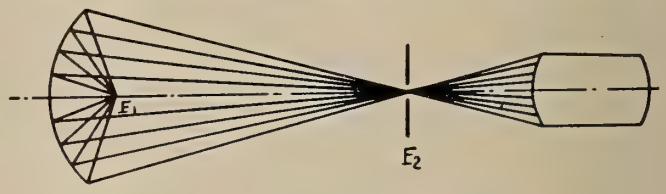


FIGURE 9.
The elliptical mirror used as a condenser.

In many incandescent filament condensing systems a spherical mirror is used to collect light which otherwise would be lost. The mirror is placed with its center of curvature in the plane of the filament, at which place the filament image will occur inverted.

The filament is thus imaged on itself with two effects: (1) the image can be shifted slightly so that the coil images fall between the coils, thus presenting a more uniform source to the rest of the system, and (2) by absorption the temperature of the filament is raised, making it brighter. This two-fold gain is possible only with sources possessing no dark region at the back as do arcs.

Light-Governing Factors

There are just three factors fixing the illumination on the screen and a change in illumination is possible only through these factors. An increase in any of the three factors—(1) the brightness of the source, (2) the quality and number of surfaces and glass transparency reflected in the factor of

DURING the many years that we have been privileged to supply fine projection lenses, we have never experienced a greater degree of cooperation than that afforded us by projectionists. We welcome this opportunity to extend Holiday Greetings to you craftsmen whose knowledge of and appreciation for the exacting demands of the projection process have earned world-wide acceptance for the best that optical design and practical application have to offer.

We are confident that this happy relationship between the maker and users of a precision product will contribute substantially to the future growth and economic security of our great industry.

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reflection and absorption, and (3) the slope angle of the extreme marginal rays to the axial point, or, in more familiar language, the f number at the

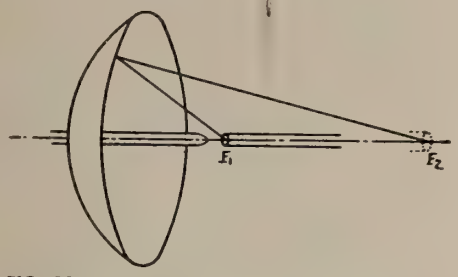


FIG. 10. Perspective representation of an arc reflector. The magnified image of the arc crater at "F1 focuses at the conjugate focus "F2".

point—will mean an increase in illumination. But there are natural limits set on all three.

The brightness of sources is fixed by the materials available and does not seem likely to be increased by large factors over current practice so long as we are dependent upon incandescent surfaces, either of tungsten in the familiar lamp or of carbon and gas in the carbon arc. Of course, it is entirely possible that radically new sources will be developed eventually. The carbon manufacturers are working vigorously to provide greater brightness.

Radiant Heat a Vital Factor

However, the greatest handicap to further progress in increasing the arc source brightness seems to be not so much in the carbon itself as in the concomitant heat transmitted to the image. The limiting factor seems to be the absorption of the film, so that visible energy alone (no infra red) in concentrations at present possible and achieved experimentally is damaging to film.

The second factor of reflection and absorption is a serious limitation to the illumination possible through a system. Each air-glass surface reflects approximately 4% of incident light (and even if filmed about 1%) which is lost to the direct beam as useful light. The demands made upon projection systems compel the addition of more surfaces, thus increasing the loss from this factor. Widespread use of coated optics, particularly in projection objectives, has tended to alleviate this factor.

Obstacles to Advancement

The absolute maximum f number possible in air is 0.5, for then the marginal rays make an angle of 90° with the axis. We are not likely to see such a ridiculous case, but serious and weighty obstacles lie athwart the path to any substantial increase in the speed of projection systems.

In the first place, because of the high quality of imagery required of projection lenses, the designers are only an insecure step ahead of demand even at present speeds. An increase in speed also means new condensing systems, very likely much more complex. Secondly, greater speeds would mean a redesign mechanically of much of the present projection equipment.

Any substantial increase in speed of present projection systems would present some of the aspects of a revolution and would further aggravate the problem of heat in the film gate.

[THE END]

Hilux Variable Anamorphic

The new Hilux variable anamorphic lens, manufactured by Projection Optics Co., Rochester, N. Y., is now ready for immediate delivery on a "substantial basis." This variable lens unit has a complete anamorphic magnification spread ranging from the old standard Academy ratio up to the full CinemaScope ratio.

Recently completed tests prove that quality of image, chromatic and linear correction, and light transmission are of a high order. The list price per pair of these lenses is $750, with Raytone Screen Co., Brooklyn, N. Y., acting as the primary distributor.

Eidophor Demonstration Planned

A demonstration of the Eidophor Theatre Tv system will be held within the next few months, it was announced recently by 20th Century-Fox. Eidophor is a theatre Tv system developed in Switzerland, which is believed capable of providing a picture much larger and brighter than is now possible. It also shows pictures in color.

Court OK's City Theatre Tax

The Alabama Supreme Court has upheld the constitutionality of municipal theatre taxes. The tax had been challenged by Bessemer Theatres, of Bessemer.

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In The SPOTLIGHT

This department expresses its gratitude for the gracious cooperation of all those Alliance members who through the past year have given so generously of their time and effort to keep their fellow members informed of the progress of the craft on all fronts, socially and economically. For you, for all of us —

a very Happy Holiday Season



John Shuff (left) presents John Baker with gold life membership card in Local 735, Mt. Clemens, Mich.

• John Baker, member of Local 735, Mt. Clemens, Mich., was awarded a gold life membership card at the Local's recent 15th anniversary dinner. Baker, now 71 years old, is the oldest active member in the Local. For the past 42 years he has worked in various theatres in Marine City (Local 735 jurisdiction), and at present he is employed in the projection room of the Mariner Theatre there.

Among the out-of-town guests present at the affair were John A. Shuff, IA vice-president and member of Local 388, Akron, Ohio; Frank Kinsora, business representative, Detroit Local 199; Jack Cassin, business representative, Port Huron Local 622; Earl Ross, business representative, Pontiac Local 620, and E. Clyde Adler, business representative, Detroit Local 38.

• Jacob S. Winick, newly elected president of the 25-30 Club, and Harry Garfman, Brooklyn and Queens business representative for New York Local 306, were presented with gold life membership cards in the Movie Social Club of Brooklyn, which is comprised of members of Local 306. The awards were made in recognition of their continuing and unselfish efforts in helping the Club bring a little happiness into the lives of unfortunate shut-ins in various Brooklyn hospitals by providing them with free movies and other forms of entertainment.

• Sam Pinanski, for many years a partner in M & P Theatres, headquartering in Boston, was honored recently at a surprise luncheon gathering of more than 100 New England film men at the Hotel Statler in Boston. During his tenure of office with the M & P Theatres, Mr. Pinanski displayed many courtesies to members of the organized projectionist and stagehand crafts, and many old-timers in the crafts remember him as a good and valued friend. Now president of American Theatres Corp., Mr. Pinanski has won national recognition for his many valued services to the industry at large.

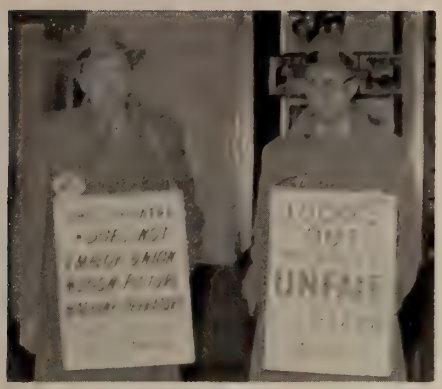
• Richard (Dick) Nolan, star halfback of the N. Y. Giants professional football team, has a rather intimate relationship with the projection field by reason of his father, Jack Nolan, being a field sales engineer for National Carbon Co. Junior Nolan, now only 22, who has starred with the Giants throughout the 1954 season in the tough pro ranks, has an interesting background.

He attended White Plains (N. Y.) High School, where his football exploits earned him Westchester County's most valuable player award; this in addition to starring in basketball and track, on the latter team running the 100- and 220-yard hurdles. Subsequently he attended the University of Maryland, where he starred on the powerhouse collegiate football squads.

• In protest against a cut in theatre personnel and in salaries, Locals 23 (Stagehands) and 223 (Projectionists), Providence, R. I., have joined forces and are picketing the Pawtucket Strand, a "dark" theatre owned by New England Theatres, Inc. The theatre chain demanded that the projectionists take a $23 weekly cut in salary and also wanted to eliminate the maintenance man. Three years of negotiations failed to produce a settlement, and on July 28 last the IA



This happy group is part of the assembly of members, friends, and guests (including several exhibitors) who helped celebrate the recent 25th anniversary of Local 680, Halifax-Dartmouth, N. S. Guest of honor at the celebration was 5th IA Vice President Hugh J. Sedgwick, shown seated front row centre amid the ladies. A banquet and stage entertainment in celebration of the event was held in the ballroom of the Nova Scotian Hotel.



Members of Providence IA Locals picketing the struck Pawtucket Strand Theatre. Charles L. McKenna, Sr., (left), projectionist, and Ralph Fields, stagehand, on picket duty.

Locals notified the theatre management that the house would be struck unless an agreement was reached without further delay. Although the theatre was closed several months ago, supposedly for lack of licensed projectionists, it is being picketed daily by members of both Locals. This particular strike has aroused a great deal of interest, as it is believed to be a "test" case and the basis for settlement with other theatres in the New England area. The Providence Locals are determined to fight the proposed reductions to the bitter end, even if it means indefinite and continuous picketing of the theatre.

• San Francisco Local 162 recently honored its retiring president, Norman E. Moynahan, with a gold life membership card in appreciation of faithful service to the Local for the years since its inception. John A. Forde, International representative for Local 162, made the award on behalf of the Local.

• James J. Brown, member of Local 440, St. John, N. B., Canada, recently completed 43 years working as a projectionist in various theatres in and around Halifax and Moncton. He began his career back in the days of hand-cranked machines when such screen luminaries as Maurice Costello, Florence Turner, Mary Pickford, Francis X. Bushman, and Bronco Billy Anderson dominated the motion picture screens. Brown has spent the last 27 years working in Moncton—22 years at the Imperial Theatre, until it was torn down several years ago to make way for a department store, and for the past five years he has been with the Paramount Theatre, where he is presently employed.



Jim Brown, IA Local 440, St. John, N.B., Canada, a practical projectionist for 43 years.

The modern equipment Brown now works with at the Paramount Theatre is a far cry from the hand-cranked projectors used in the early days of motion pictures. He recalls that in the old days, when 45 feet from projection room to the screen was considered a "long throw," the choice seats were in the gallery (the throw in the Paramount is 125 feet).

In a rather nostalgic vein, Brown also recalls that comedies were the top movie fare in the old days. He remembers when slides were flashed on the screen asking the ladies to remove their hats, and when by faster or slower turning of the hand-cranked machines the playing time of a picture could be either speeded up or stretched —all depending upon the number of patrons in the theatre. He remembers, too, the first "talking pictures" when the talking was done by actors standing behind the screen and who cued their lines to the action seen through the screen. Did we hear anybody say something about the "good old days?" That is precisely what the youngsters of today will be saying years hence.



Norman E. Moynahan (center), retiring president and charter member of San Francisco Local 162, is shown being presented with a gold life membership card by IA Representative John Forde. Seated at the extreme right is Albert B. Cohn, president of the Local.

• We are happy to report that a satisfactory agreement was finally reached between Local 332, Clinton, Iowa, and Central Theatres Corp. A new four-year contract providing for a 5% increase was signed, and the strike vote taken by the Local was recalled. IA Representative LeRoy Upton assisted the union officials in the negotiations.

Greetings and Best Wishes

THE NEW YORK STATE ASSOCIATION

of

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Greetings and Best Wishes

to my brother craftsmen throughout the Alliance

MERLE H. CHAMBERLIN

Chief Projectionist, M-G-M Studios

Culver City, California

II. THE LIVING PICTURE. The concluding article of two in which are detailed the development of the motion picture from its inception down to the present. Originally appearing in "Movie Makers" magazine, these articles attracted widesprad industry interest and acclaim.

By JACK E. GIECK

From Toy to a Great Industry

FOR action lasting more than a few seconds some means of continuously replacing the pictures had to be found. One solution was a camera invented in 1876 by Wordsworth Donisthorpe in London. His machine, shown schematically in Fig. 5, consisted of a deck of glass plates coated with a new dry gelatin emulsion which was much faster than the wet collodian or albumen in use at that time. After each plate was exposed, it dropped onto the stack below, permitting the next one to move into place. The camera took pictures at 8 frames per second (Fig. 5).

With this apparatus, Donisthorpe not only took conventional movies, but he also made the first time-lapse studies of such subjects as growing grass, opening buds and frog metamorphosis. To view his work, however, he had to resort to the Zoetrope.

Finally, in 1889, he built his "Theatraxinoscope." In this machine, a continuous band of celluloid bearing the transparencies wound in and out of his skeletonized projection Praxinoscope. Interestingly, only the moving figures appeared on the film. All the backgrounds were projected separately by means of a magic lantern slide. Reynaud's programs apparently lasted 10 or 15 minutes.

First Flexible Transparent Film

To make motion pictures practicable, some sort of flexible transparent material was needed to transport the pictures. The invention of celluloid by Rev. Hannibal Goodwin in 1887 provided the ultimate solution. Within two years a commercial movie house, *Le Theatre Optique,* was operating in Paris. Though the pictures were strictly animated cartoons, they were the first movies to tell a story.

The Frenchman who devised the equipment was Emile Reynaud. In 1887 he had patented his "Praxinoscope," a Zoetrope whose pictures were viewed through a set of revolving mirrors in the center of the cylinder instead of through slots in the side. This device eliminated the vertical distortion associated with slot-shutter viewing.

Hand-Drawn Pictures

Several years later he built a projection model which had glass sides bearing hand-drawn transparencies. A beam of light from a magic lantern was bounced off the mirrors through each transparency successively, and the result was picked up and projected through a lens.

First Film Strips

The first photographic experiments using the new strip film were also performed in Paris by a Dr. Jules-Etienne Marey, who corresponded with Eadweard Muybridge in America. Like Muybridge, he was primarily interested in the analysis of animal movement. In his letters, he complained that strips of film longer than four meters were unobtainable—and

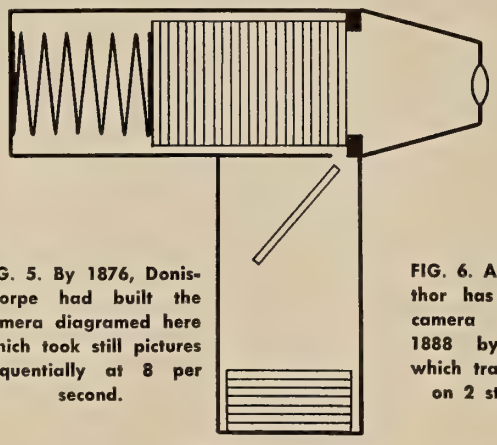


FIG. 5. By 1876, Donisthorpe had built the camera diagramed here which took still pictures sequentially at 8 per second.

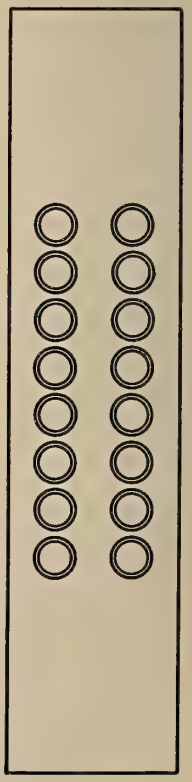


FIG. 6. At right the author has diagramed a camera designed in 1888 by L. LePrince which trained 16 lenses on 2 strips of film.

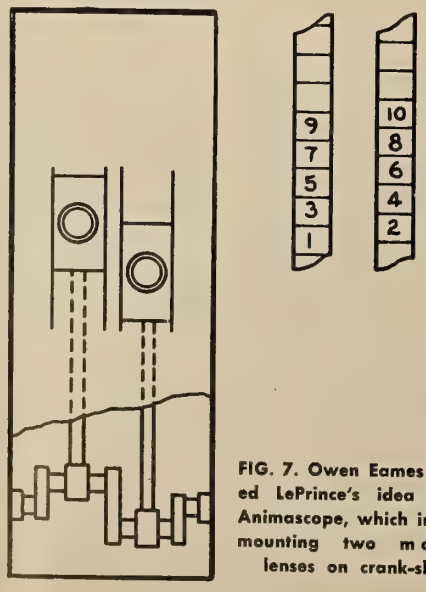


FIG. 7. Owen Eames adapted LePrince's idea to his Animascope, which involved mounting two moving lenses on crank-shaft.

with his prodigious frame size (3½ square inches) he got only 40 frames per film.

Many ingenious and complex gadgets to handle the new flexible film made their appearance, one of them, a camera invented by Louis LePrince in 1888, employed 16 lenses which were arranged as shown in Fig. 6.

This camera used two film strips, behind each bank of lenses. When the camera was operated, the left bank of lenses would function first, each shutter (beginning at the top) being tripped successively to make a single exposure on the stationary film behind it. When all the shutters on the left bank had been fired, the right bank would begin to operate; and while the right film was being exposed, the left film would be pulled down 8 frames and the left shutters recocked.

Owen Eames' "Animascope"

A variation of this same theme was Owen Eames' "Animascope" (Fig. 7) in which both films moved *continuously* and only two lenses were used. These lenses moved on vertical slides and were actuated by a crankshaft, so that each lens was moving downward with the film while its shutter was open. The frame sequence alternated between the two films as shown.

It will be noted that both of these machines were actually stereo cameras, but no attempt was made during viewing to separate the left and right eye images. As a result, foreground objects vibrated on the screen as the viewpoint shifted back and forth.



FIG. 8. Early Kinetograph strip-film cameras designed by Thomas Edison, as well as several Pathe and Olikos models, are seen in this collection at the Henry Ford Museum.

The next highlights in motion picture history are Edison's development of perforated film; Lumiere's design of the Cinematographe, the first projector to employ a practical intermittent movement, and the advent in 1898 of synchronized sound-on-disc.

All of the early ribbon-film cameras suffered from the same complaint: poor film registry—that is getting the film to move exactly the same amount

Season's Greetings

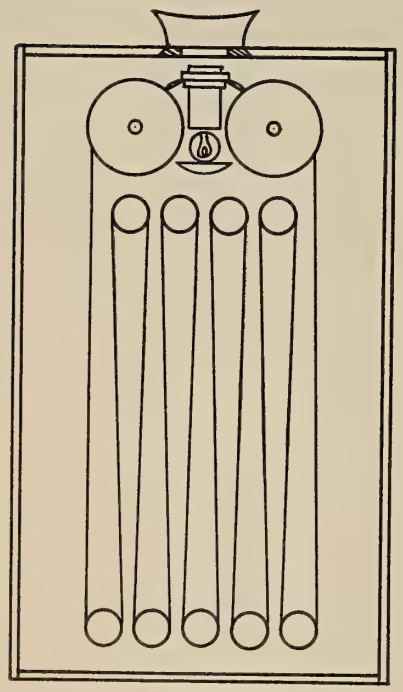
We welcome this opportunity to extend Holiday Greetings to our many friends in the projection craft who, working together with us through the years, have enabled us to install and operate at peak efficiency the finest projection equipment in the world. Our congratulations to you craftsmen who have made our joint endeavor a very happy association throughout the many years.

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FIGS. 9-10. Edison Kinetoscope, a peep show machine activated by a coin, brought movies to the people. Film path is plotted below.



vertically between frames without any lateral shift. It was Thomas A. Edison who provided the solution to this problem with his invention of perforated film.

1893—Edison's Kinetoscope

Edison had begun experimenting with movies during the 1880's. His first camera was built much like a Zoetrope. It took pictures in a *spiral* on the inside of a cylindrical drum lined with film. A number of his later "Kinetograph" strip-film cameras (as well as several early Pathe and Olikos models) may be seen in Fig. 8.

It was Edison's viewing apparatus which made the motion picture a commercial success *in America*. One of the original models of his "Kinetoscope," patented in 1893, is shown in Fig. 9. A coin-operated, peep show machine, it employed a continuous film which was viewed directly by the observer (see Fig. 10). The frames were printed side-by-side on the film, which sped by at the rate of 46 frames per second.

The quality of the image was not good, since the film moved continuously while the observer watched it through a revolving shutter, and a certain amount of blurring was inevitable. But the public loved it anyway, and penny arcades made lots of money until projection techniques were perfected.

[TO BE CONTINUED]

Color Tv Now Available In 65 Major Cities

Color television can now be transmitted to 65 cities across the nation. Already 145 Tv stations in these cities are receiving network television service and 95 of them are receiving it in color, as well as in black-and-white. Most principal Tv routes are now equipped for color and will be able to transmit color programs to about 95 cities by the end of the year, A. T. & T. Co. announced recently.

Of the 187 stations presently located in these cities and receiving network service, a total of about 125 are expected to be ready to broadcast in color by late December. The announcement pointed out that about 31,000 of the 59,000 channel miles of Tv facilities now in service had been re-engineered and re-equipped to carry color.

Color Compatibility Vital

Bell System facilities had been used for experimental color transmission for several years, but it was not until the approval of the compatible system by the F.C.C. on December 17, 1953, that color Tv got underway on a regular basis. Use of the compatible system makes it possible for owners of conventional black-and-white Tv sets to receive color broadcasts in black-and-white. Owners of color sets can receive both black-and-white, and color programs as broadcast.

On January 1, 1954, the first public colorcast was carried from coast-to-coast when the Tournament of Roses Parade in Pasadena, California, was fed to stations in 18 cities in the U. S. By May 1, the first coaxial cable route, between Dallas and Houston, Texas, had been readied to carry color. Long Lines also noted that 1954 marks the 25th anniversary of the first public demonstration of color Tv. On June 27, 1929, a group of newspaper reporters gathered at Bell in New York to see a colorcast of an American flag rippling in the breeze.

RCA Employes Honored

Radio Corp. of America has announced that 265 employes of its product manufacturing and service division, who in 1954 completed a quarter century of service, have been inducted into the RCA Victor 25-year club. Nearly 1,800 men and women have become eligible since the group was formed in 1948. The new members were presented with gold watches in a series of banquets.

Season's Greetings

CLAYTON PRODUCTS CO.

New York 63, N. Y.

Season's Greetings

LOCAL NO. 162
I.A.T.S.E. and M.P.M.O:
San Francisco, Calif.

Greetings and Best Wishes

PROJECTIONISTS LOCAL NO. 407
I. A. T. S. E. and M. P. M. O:
San Antonio, Texas

Industry Interdependence Cited

By PAT McGEE

Keynote Speaker, TOA-TESMA-TEDA-IPA Convention

The interdependence of every branch of the motion picture industry was never more forcibly demonstrated than at the recent joint industry conclave in Chicago where exhibitors, the employers, and projectionists, the employees, met frequently in informal gab-fests to discuss not projection exclusively but industry problems overall. As in other major industries where clear thinking and foresight prevail, the day has long since passed when the common interest is subordinated to short-sighted self-interest—which has only a brief life span.

For this reason, IP believes that the appended excerpts from the convention keynote address by Pat McGee is of extreme interest in that it points up the fact that financial security for both exhibitor and projectionist is dependent upon a mutual understanding of and the desire to solve common industry problems.

THIS convention will deal with our most pressing problems. Consider, first, the effort to have the Federal Communications Commission approve a type of home box-office Tv, a project which presents many immediate dangers. Another problem of great importance is to maintain the gains won through the reduction of the Federal excise tax, which is threatened in many states and cities by the imposition of local taxes.

Just think where you would be today if you still were paying the full 20% excise tax, instead of which more than 8000 theatres in the country are paying no tax at all!

Overshadowing all problems is the very basic need for our theatres to have sufficient pictures to provide the change of diet necessary for our patrons, and the necessary prints to make this possible. Unless we have good pictures at reasonable terms and in ample supply, *we need not concern ourselves with any other problems!*

Industry Leadership Lacking

One of the by-products of the tax campaign's research and probing was the startling realization that nowhere in this industry could you find leadership or statesmanship in the *true* sense of the word. Instead of statesmanship, we found in all branches of the industry people working for their own interests to the *exclusion of all other interests.*

Because the producers and distributors are few in number and deal in millions, we have expected them to be looking out for the interests of the industry rather than confining themselves *exclusively* to their own interests. In short, we expected them to exercise enlightened self-interest. I am sorry to say that this is lacking in a major degree.

What must claim our immediate attention is the fact that we are not out of the woods as an industry. From 1946 to the present, we have had a steady decline in attendance in our theatres. This decline has never been checked and continues today. In the face of increased results in major cities, 80% of the theatres today are showing 7% less attendance than we had last year! and the dollar volume, including $123,000,000 provided by tax relief, has not increased materially.

In our own circuit, attendance is 7½% below a year ago, while our dollar volume has increased 6%, which should have been a 12½% increase, based on the fact that we have a net savings of 12½% on the excise tax. With increased film rentals of 5 to 10%, you can see what happens to the profits.

Even in the days when we boasted of selling 80 to 90 million tickets a week, we never had that many individual theatregoers. We had about 45 million frequent attenders. People did go two and three times weekly; but with the declining number of pictures there is also a proportionate decline in the *opportunity* to attend, which is one explanation for lowered attendance in total.

Moviegoing Habit Broken

Of course, Tv has accounted for some of this, too, but between both factors

★ ★ ★

Season's Greetings

NATIONAL CARBON COMPANY

A Division of Union Carbide and Carbon Corporation

NEW YORK

★ ★ ★

the public *got out of the habit* of going to the movies, a habit on which was founded a major part of the industry's success.

Our job will not be done by relying on a few big pictures at increased admission prices!

In a few big cities the fine new pictures at greatly increased admission prices show vastly improved grosses, but these results have not reached, and are not likely to reach, 80% of the theatres in the nation. There has always been, on the part of production and distribution, an inclination to repeat what the other guy has said—thus, you hear the cry that fewer but better pictures are the answer to the industry; while we exhibitors, with our fingers closer to the facts, say that such a policy will eventually kill us!

We say, always try for better pictures, *but more of them*, to keep up interest in the thousands of theatres in smaller communities of the country which cannot live in a market of short supply.

Playing Time, Print Shortage

I now mention extended playing time and print shortages. As the number of pictures available decreases, those theatres in the key cities find their film terms and the length of runs increasing, and their admission prices increasing. The too-high film rental reduces or eliminates your profit to start with.

The too-long run causes you to reach the point where the declining gross brings you to the break-even point, and the lack of a picture to follow compels even further extending the run, and this throws you into a loss.

In the neighborhood, or sub-run field, the high terms have reduced the profit, and the long run downtown has milked your potential, so that between the two factors this group, too, shows a loss. Fewer features mean fewer pictures clearing to the sub-runs, which cannot extend playtime to offset the lack of product, since their customers have already bought tickets downtown.

The same thing exists in the smaller towns. Theatres which changed three and four times a week now change twice a week, or play weekends only. If they change oftener, they are picking up old pictures which have played many times already, merely to fill out the playtime and with no hope of profit.

Estimate of Possible Closings

These problems could be cured quickly with a larger supply of good pictures. Producers say that this is impossible. If it really is impossible, then we must face the fact that from 5- to 8000 theatres in this country must close! Friends of mine in distribution have actually said that they are *reconciled* to the loss of 5000 additional theatres.

This is a heart-breaking thing to

Short Subject V-V Prints!

Projectionists should be on the alert for the forthcoming VistaVision shorts which are now in production by Paramount. Proper identification of prints is the frst requisite for a satisfactory screen image. A V-V short subjects production program that will yield from six to eight pictures a year at the outset has been announced by Par.

The one- and two-reel subjects in the new production and screen presentation process will be in addition to the regular one-reel Technicolor cartoons and black-and-white subjects the company has been turning out in 1.66 to 1 aspect ratio. During the 1954-55 short subjects year, which began Oct. 1, Par. will release 60 such one-reelers.

Par's first short in V-V, titled "Vista-Vision Visits Norway," currently is being readied for general release, thus enabling theatres booking "White Christmas" to present their first V-V, perfectly-balanced program. Both are in Technicolor as well as V-V.

Greetings . . .

We at Century Projector Corporation are happy and proud to extend Holiday Greetings to the projectionist craft which has contributed so much to the progress of the motion picture industry.

As the designers and manufacturers of the first professional horizontal-type projector, we know that the fine spirit and technical know-how displayed by the projectionists at the Radio City Music Hall in New York City on the occasion of the first showing before a critical audience of VistaVision's "White Christmas" is reflected in the painstaking efforts of the craft throughout the world.

This community of technological interest and effort can only redound to the greater success of our industry.

Century

—Many Thanks

CENTURY PROJECTOR CORPORATION

729 Seventh Avenue New York, N. Y.

those exhibitors numbered among the 5000. The disparagement of the small-town and the neighborhood theatres shocks me, perhaps, most of all. The dollars-and-cents value of these theatres may not be great. The social value of these theatres and their value as developers of "feeder-business" is beyond estimate.

Wise sales analysts have demonstrated that while a smash picture can recover its investment in the larger situations, the widest possible playing time is needed to rescue the run-of-the-mill picture and the nervous "A" pictures from the loss columns. We say that if a third of the theatres close, the industry, as constituted today, cannot survive. Also' it would inevitably lead to still fewer and more expensive pictures, and it is hard to say where this would end.

Admission Price Level

There is no doubt that the declining attendance is coupled with ever increasing admission prices. There is danger that we are over-pricing ourselves at the box-office. Remember the book publishers who were in the doldrums. As an experiment, a number of stories were issued in a 25-cent, paper-back edition, which caught on like wildfire, rejuvenating the entire business. There is a lesson here for us.

Distributors have watched the key center grosses and have assumed that they can get 40% and 50% film rentals without question, when we know that 80% of the theatres, by paying such terms have reduced their profit margins to the point where they cannot maintain their properties.

Giant Research Program Urged

Instead of guessing at things, the whole industry should join in a giant engineering research and analysis, under neutral direction, such as COMPO. Our entire machinery is outmoded and archaic. There is an appalling amount of waste in distribution and some remains in production, although many economies have been effected in the studios. Where there is waste, no matter where found, it ought to be eliminated. Industries, such as oil and steel have found ways to streamline their distribution methods, and ours cries for surgery.

Let's boil all of this into a few words. Producers and distributors have failed to exercise "enlightened self-interest" in dealing with exhibitors. Their belief in fewer but better pictures is being followed blindly without regard to the end of the road several years hence. Their policy of fewer but better pictures, coupled with unreasonable terms, has deprived the American theatre of its rightful share of the boxoffice returns and of the tax saving which we provided. The pendulum has swung too far in favor of the seller. The market must be brought into balance through economies which will enable the distributor to allow easier film terms; and the market must be brought into balance by providing additional pictures from whatever sources are available in order to revive competition on a healthy basis.

Progress Requirements

We can go about this by following a planned program of:

(1) Encourage present producers to make additional pictures as good as they know how.

(2) Encourage foreign producers to analyze our needs in the United States and make pictures that will interest American audiences. This can be done by using American stars in foreign productions coupled with foreign personalities. Mr. J. Arthur Rank wants a larger share of the American market. Our screens are open to him but he must find a way of appealing to the American theatregoer who so far has shown little interest in most English pictures.

(3) We must have a distribution channel more sympathetic to our needs for product during April and May, November and December, when we really must tighten our belts for lack of film.

New B. & L. C'Scope Lenses

Bausch & Lomb's new CinemaScope camera lenses have been delivered to five studios as well as to 20th-Fox. Other studios are Warners, M-G-M, Columbia, RKO Radio and Walt Disney Prods. Deliveries to additional studios are to be made soon.

While the full Bausch & Lomb series of CinemaScope taking lenses will total seven, ranging from 13 to 152 mm in focal length, thus far only the 35, 40 and 50 mm lenses have been delivered. Anxiously awaited is the 13 mm lens, capable of covering a 122° horizontal field angle, seen able to dwarf anything presently available to photograph films for 35 mm projection. The lens series eventually will cover from 122° to 18°.

City Theatre Tax Repealed

The city of Springfield, Ohio, has repealed its three percent admissions tax, effective January 1 next. It is the largest city in Ohio to do so in many years.

Greetings

As power supply-specialists we pride ourselves on having provided for many years the most dependable equipment for projector arc current. For all types of operation, and for all current ranges, we have supplied the craft with both rectifiers and motor generators to meet your every requirement.

With great pleasure, therefore, we at this time acknowledge our indebtedness to the projectionist craft and extend our thanks and heartfelt best wishes for a Happy Holiday Season.

J·E·ROBIN, INC. MARK OF QUALITY

J. E. ROBIN, INC.

267 Rhode Island Avenue, East Orange, N. J.

Century Projector Corp.'s Fabulous Feat in Producing Horizontal-Type Projector

ONE of the most glowing tributes to the ingenuity and resourcefulness of the technical group within the industry—which today is acutely technologically-conscious—was the achievement by Century Projector Corp. in designing and producing within a whisper of time the double-frame, horizontal-type projector which was used at the world premier of the VistaVision print of Paramount's "White Christmas" at Radio City Music Hall in New York City, shown on a giant-sized screen.

This projector was described in detail in the October last issue of IP.

The accompanying line illustration offers graphical evidence of the all too brief period in which was translated an idea into a mechanical reality—but this in no wise conveys the near-heartbreak, the bated breaths and the back-breaking feverish activity which was poured into the production within an incredibly short span of time this revolutionary projector mechanism.

Near-Incredible Time Schedule

A blow-by-blow, transcontinental phone-calling, drafting-board and machine-working schedule (omitting the near-hearthbreak attendant upon a full crew of technicians which was "ready to go" only minutes before the scheduled opening time) would run something like this, according to Larry Davee, engineer and sales manager for Century:

Sept. 22. Regular review of experimental work by Paramount studios in Hollywood and decision to "go ahead."

Sept. 23. Phone call from Hollywood to New York during which Century accepted order to design and produce the radical new projector intended to show film that runs horizontally through the mechanism, with each frame eight sprocket holes in width.

Sept. 24. Development begun at the Century plant in Long Island City. Problems included designing a heavier intermittent movement to absorb the shock of an eight-sprocket hole pull-down *(or, rightly, pull-to-the-side)*; design of extra sprockets to redirect path of the film from the *horizontal* path in the head to the *vertical* position of the magazines; and reversing the film path in the projector because the camera and printing processes for the special prints could only produce them in reverse.

Oct. 6. First mechanism inspected by Charlie Muller, chief projectionist at Radio City Music Hall, in the Century factory.



Charlie Muller, director of projection at the world-famous Radio City Music Hall in N. Y. City

Heads Delivered to Music Hall

Oct. 8. Two mechanisms delivered to the Music Hall.

Oct. 13. Screen at the Music Hall was available for one hour for lining-up projectors and other tests.

Oct. 14. Preview for press, followed by continuous public showings thereafter.

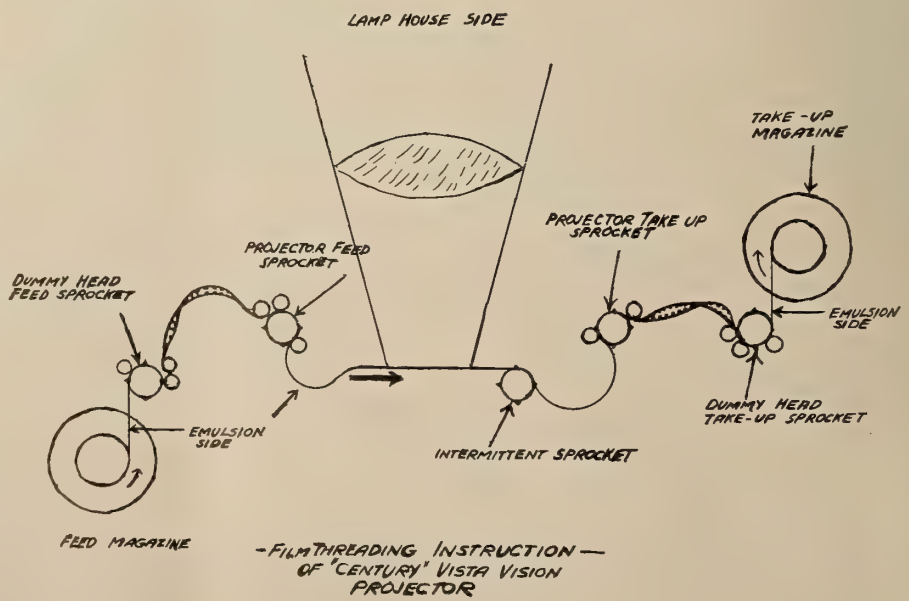
Mr. Davee estimates that the first horizontal projector, which was completed in 12 days would ordinarily have taken from four to six months to design and produce. Century is now in the process of building standard production models of the horizontal projector, which will be ready for delivery in January next, and will have optical soundheads. The first models did not have sound pick-up but were synchronized in the projection room with a separate soundtrack run through another standard 35-mm projector.

S	M	T	W	T	F	S
		Sept.	(22)	(23)	(24)	25
26	27	28	29	30	Oct. 1	2
3	4	5	(6)	7	(8)	9
10	11	12	(13)	(14)	15	

Graphical representation of extremely tight time schedule for conception, design and production of the Century-VistaVision, horizontal-type projector used for world-premier showing of "White Christmas" at Radio City Music Hall in New York City. Significant dates, as explained in accompanying article, are encircled.

Not discounting in the least the travail of the Century factory technicians, Mr. Davee is on record as stating that "without the magnificent cooperation of Charlie Muller, director of projection at the Music Hall, and his swell gang of craftsmen in both the projection room and on stage, this accomplishment would have been impossible."

Take a bow, Charlie, and gang. IP is proud to have you aboard.



Rough sketch which provided the film-threading guide for the use by the projection crew of Radio City Music Hall of the horizontal-type projector as used for the first time. This drawing does not necessarily represent the ultimate form of this new and novel film-threading procedure.

Projectionist Problems as Seen From the Viewpoint of the Lens Maker

SOME projectionist problems arise from the different languages spoken by projectionists and the lens people. For instance, "This lens gives a flat picture." To the lens designer "flatness" means that the image is projected to a flat surface with very little loss in definition from the center to the edges. To the motion picture trade people, it usually means that the illumination is uniform across the screen.

The biggest problem is caused, however, by the fact that lenses are carefully designed for certain standard conditions of operation, but that in actual practice these conditions are often not met. Few people would want to take a 1954 automobile engine and put it in a chassis built in the 1920's. What is built in 1954 should be used and associated with equipment modernized to take full advantage of recent developments.

The results of the toil and effort of countless individuals are recorded on an area not much larger than the size of a 25c coin, and this area has to be magnified many thousand times by a lens so that millions of people may appreciate and enjoy these records. Good lenses are made to be equal to that task and they should be treated as one of the most important components of the projection technique.

Vital Projection Requisites

Getting into the technical aspects of conditions for good projection, we must list the following:

1. The lens must be held rigidly and be properly centered and squared to the aperture.

2. The front of the lens and associated apparatus should be large enough so as not to interfere with the light passing through the lens.

3. The film, aperture plate and other equipment near it must be properly cooled and designed so as to eliminate flutter and excessive buckling of the film.

Enlarging upon these points, it happens quite often that a good lens is blamed for uneven focus when the holding mechanism is obsolete and at fault. Sometimes the clamp is too loose and the lens shifts during operation; sometimes the clamp is too tight and introduces strain in the lens; and sometimes the lens holder has been thrown out of alignment and the lens is therefore cocked in the projector. For good projection, the carbons, center of the aperture and the lens axis should be lined up as carefully as possible, especially with modern high-speed lenses.

Factor 2 aforementioned was not much of a problem until recently when the use of short focal length lenses was greatly increased. Because of the short focal length, the lens is located close to the film, and the distance from the front surface of the lens to the face of the projector may be as much as 5 or 6 inches.

For the purpose of reaching the lens, shade tubes are added to the

★ ★ ★

Holiday Greetings

and

Best Wishes for 1955 to All Our Friends

★ ★ ★

THE BODDE SCREEN COMPANY

8829 VENICE BOULEVARD LOS ANGELES 34, CALIF.

front of the lens to extend in front of the projector. Manufacturers constantly remind the trade that shade tubes should be used only with care with short focal lenses. Many installations are destroying their picture quality by misusing these tubes. The light beam is cut, and instead of getting the amount of illumination at the edges that passes through the lens, this illumination is reduced to a very low value by the front of the projector or by shade tube interference.

Most of the projector heads manufactured since the war extend quite far in front of the film, and cause a problem with the use of short focal length lenses. To remedy the situation, a projector can either be modified to give a larger opening such as the modification for use of 4-inch diameter lenses, or by using lenses designed to pipe the light through the small opening of the projector head.

Modern lenses, which mean high speed and also mostly short focal length, are designed to transmit a tremendous amount of light. As everybody knows, a lot of light means a lot of heat. With heat we encounter problems of expansion and distortion which are all concentrated near the aperture, but as many carefully planned installations have proved, this problem can be overcome *not* in the lens but in the provision for proper cooling of the projector.

Expediency and false economies can also do a great deal to reduce the efficiency of properly designed projection equipment. Lenses are designed for a specific purpose and, in particular, a definite focal length. For an amateur where quality of projection might be secondary to convenience, elastic magnifications might be advantageous. Professional projection requires a good quality ahead of convenience, and lenses can be made to do various tricks only at the expense of the end results.

Mobile Cinerama Equipment

Mobile equipment, capable of handling showings of "This is Cinerama," in smaller theatres was demonstrated recently on the West Coast by the National Theatres chain, which plans to use the equipment. A basic feature is a system of mirrors which makes it possible to use only one projection room instead of the three heretofore required in Cinerama installations.

Selenium 'Selectifier' with Fine-Control Features

Modern projection requisites have dictated the final form of the "Selectifier" line of selenium rectifiers in order to provide easier regulation and overall better adaptation to the high-power arc-lamps needed for wide-screen projection. Selectifier ranges for all indoor and drive-in requirements include ratings, in amperes, of 50-70; 70-90; 90-115; 150-200; 200-250, and 260-300—all these being for 3-phase power supply.

Where only single-phase current is available, there is a Selectifier model to which have been added choke filters to produce the best possible supply under the circumstances.

Salient Design Features

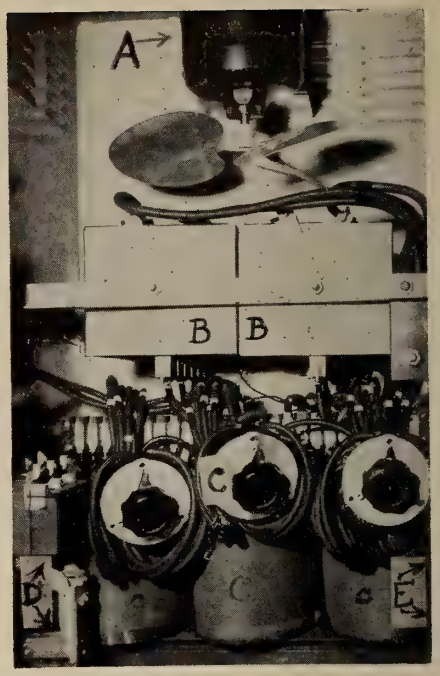
The various Selectifier units, in whatever range, were so designed as to provide maximum and minimum amps-and-voltage supply for each specific application. That is, once the rectifier is installed, the amp-voltage output to the arc may be adjusted to the proper level for continuous, trouble-free operation. By adjustment of each of the three primary rotating switch contacts, and by raising each switch one tap at a time, it is possible to increase the output current by approximately 1 volt and 2 amps *per step*. This is fine-control protection.

Among the noteworthy features of Selectifiers are:

1. Downdraft ventilation with clean air intake high on the sides of the cabinet. A 14-inch, 1/6-h.p. fan ("A" in photo), with ¼-h.p. frame, permanently lubricated, to force the cool air down over the 50,000-hour selenium stacks ("B" in photo), and the oversized transformer coils, dissipating any possible excess warmth over the floor instead of picking up dust-laden air from the floor and blowing it onto the equipment.

2. Stacks may be relied upon as long as a motor generator, without brush or commutator troubles.

3. Transformers large enough for continuous operation, with all glass-insulated, heavy square magnet-wire-wound coils, big enough to carry the second arc, too, in an emergency.



Norpat's "Selectifier" selenium rectifier, lettered designations of which are explained in the accompanying story.

Trouble-Free Operation

4. Heavy oversized, 110 volt-actuated, magnetic 3-pole contactors instead of a small relay, to prevent contact troubles and replacements.

5. Independent rotator switches on each phase to select exactly the voltage and current required, even when the evening's Tv and marquee loads come on and drop the line voltage.

6. A means for changing the low-voltage A.C. from "low" to "high" voltage ranges in the event arcs are changed.

7. An alarm bell ("E" in photo), controlled by a thermostatic switch, to warn the projectionist of overheating, so he can use a floor fan temporarily, in the event all other built-in precautions are not enough.

Complete details from Norpart Sales, 113 West 42 Street, New York 36, N. Y.

Greetings and Best Wishes

MOTION PICTURE PROJECTIONISTS
LOCAL NO. 303, I. A. T. S. E.
HAMILTON, ONT., CANADA

H. H. THORNBERRY
President

H. W. USHER
Business Manager

LETTERS TO THE EDITOR

To Err Is Human

To the Editor of IP:

In reference to my letter which appeared in the September issue of IP, (page 28) I now believe some of the statements contained in it to be misleading. The statements I refer to were concerned with the CinemaScope picture we obtained here on a 26-foot flat screen. Our problem was caused, I believe, by the six-inch focal length objective lenses we were using at the time in combination with the anamorphics.

One of these lenses was excellent in focus and sharpness. The other lens had been blemished and was giving a hazy and cloudy picture. These lenses were installed temporarily because modern six-inch lenses were unobtainable at the time. The distortion I mentioned in the letter, which caused straight lines to appear as curves on the screen, was due to defects in the early wide-screen pictures, I am now told.

I also spoke of keystone distortion, but at this theatre we actually have a very low angle of projection, not exactly screen center, but not enough to cause any noticeable distortion. I was too hasty in my previous letter and certainly should have stopped to think before jumping to conclusions. Our service engineer here is a man of very high standards and long experience. I should have consulted him further before stating facts which were exaggerated. Now that new six-inch lenses have been mounted on the projectors, we are getting an excellent CinemaScope picture, and have received many favorable comments.

ARNOLD HUMPHREYS
Bathurst, New Brunswick, Canada

EDITOR'S REPLY: It happens every now and then that a number of "blind alleys" must be investigated before the solution of a technical problem finally turns up. Even though we have never personally encountered the particular type of trouble described in Mr. Humphreys' first letter (IP for September 1954, page 28), we are more than glad to have had the opportunity to ponder the problem from a theoretical point of view.

The difficulty described *could* happen in unusual cases of mismatched optics. But the main thing is that the cause of the trouble has been discovered, and that the CinemaScope projection in Mr. Humphreys' theatre is now entirely satisfactory. All's well that ends well. We are also happy to be assured that Mr. Humphreys' service engineer is among the great majority of engineers who, we know by experience, are highly competent and unfailingly helpful.

Proper Lens-Cleaning Procedure

To the Editor of IP:

I have read with great interest the numerous articles IP has published on the proper method of cleaning lenses. We seem to be in agreement on the method of cleaning; but we disagree on the use of water and soap or detergents *vs.* volatile solvents.

Kollmorgen Optical Co. instructions for the cleaning of lenses have been practiced since 1948, and we have had very few, if any, negative comments. We do get lenses in for reconditioning which evidence that powders have been used in the cleaning process, with the result that the lens coating, especially on the outside of the rear element, has practically been removed.

We feel that solvents are more advantageous as a cleaning agent than water, soap and water, or detergents and water, because they dissolve oily residue more readily. Also, solvents evaporate, while water must be dried off.

We try to make our instructions both simple and effective. We specify lens tissue because it was found impossible to accurately describe just what constituted "clean cotton cloth" or "well-washed" linen.

Another problem in recommending soap as a cleaning agent was to specify *exactly* what was meant by "a weak soap solution." In some areas, because of "hard" water, considerably more soap would have to be used than in "soft" water areas. The soap must be removed with distilled water, or layers will form and become baked by the heat of the arclamp. The only possible way to remove such a deposit would be by volatile solvents.

In repairs, we have found that the rear gasket seldom shows any disintegration, regardless of what method of cleaning was employed.

No matter what the method of cleaning, the lens coating, especially on the rear element, will eventually wear off. Kollmorgen has a standard reconditioning job that consists of repolishing and recoating this element; cleaning, adjustment and resealing. Such a job, if it is done every two or three years, will, we believe, maintain the lenses in excellent condition.

J. A. FETHERSTON
Kollmorgen Optical Corp.,
30 Church St., N. Y. City.

I. A. OBITUARIES

WILLIAM J. GUNDLACH, 62, president of Local 106, Marion, Ind., died suddenly on November 21. A member of Mixed Local 106 since 1923, he spent his early years traveling around the country with road shows. In later years he worked as projectionist in local theatres and at the time of his death was employed at the Paramount Theatre in Marion.

FRANK MILLER, member of Local 171, Pittsburgh, Penna., died recently after a lingering illness. He held membership in the Pittsburgh Local for many years and worked as projectionist at the Plaza Theatre until ill health forced him to retire from all activities.

JOHN FEATHERSON, 52, member of Detroit Local 199, succumbed recently to a heart attack. For the past 26 years he worked in the projection room of the Washington Theatre in Royal Oak, and his sudden death came as a shock to his co-workers.

T. C. CLARK, member of Local 547, Sheffield, Ala., for the past 30 years, died in his sleep from a heart attack on November 16. Known locally as "Picto" or "Big Alabama," he was popular in projection circles in and around Sheffield.

EARLE WATERS, 52, member of Local 680, Halifax-Dartmouth, N. S., died suddenly last month. For many years he had been employed at the Garrick Theatre, known in the days of vaudeville as the Strand Theatre.

JAMES C. CHAMBERS, SR., 75, member of Local 143, St. Louis, Mo., died last month after an illness of several years. He was very well known in projection circles in the St. Louis area, having worked in many of the theatres there since he joined the Local back in 1909. His son, James, Jr., is also a member of the Local.

LOUIS J. BOUDREAUX, 58, member of Local 293, New Orleans, La., and projectionist at the Saenger Theatre there since it opened 27 years ago, died suddenly last month. His untimely death was a shock to his many friends in the industry.

Theatre Tv in Germany

German theatre owners in Bavaria are planning a theatre Tv network to provide special news programs via closed circuits to some 300 situations. The owners expressed dissatisfaction with German newsreels. Regular Tv service in Bavaria was started only this Fall.

STUDIO LIGHT HISTORY

(Continued from page 16)

they provided a soft, more or less non-directional source of light, the cinematographer also often tried to use incandescent tungsten bulbs for certain effects. His efforts in this direction were largely frustrated at the time because of the low speed and limited color sensitivity of the film then used. The preponderance of light from the tungsten bulb is in the red end of the spectrum and his film was blind to red.

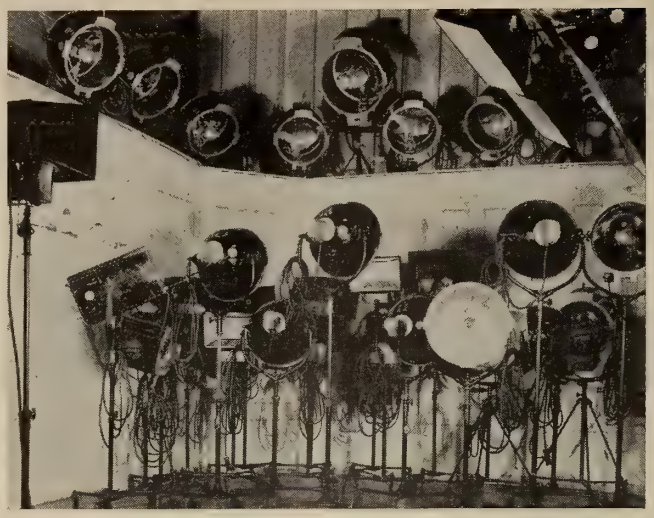


FIG. 4. Grouping of incandescent tungsten lamp equipment of the types more popular in the late 1920's and early 1930's with some still in use.

Panchromatic Film

Color motion pictures were not a major factor in those days, but color rendition in shades of gray of the same saturation as seen by the eye when looking at the original was something the cinematographers needed badly. Even a reasonably light-red object would photograph black. The advent of panchromatic film gave the cinematographer a better control of his gray scale and also made it possible for him to start experimenting with incandescent tungsten bulbs.

In spite of equipment that was ill-adapted and inefficient, the cinematographer was beginning to achieve an art form when the advent of sound in 1927 imprisoned his cameras in static, awkward, soundproofed booths. The importance of the new sound medium transcended all demands for photographic quality and the cinematographer was forced to reduce his art to a mechanical function in order that acceptable sound might be obtained.

Restrictive Lighting

Restricted to small sets and with his camera static, the cinematographer began to experiment with fresh approaches to his goal of photographic dramatic effect. Soon a number of cameras were running on the same set in order to achieve the effect of movement, and the cinematographer began casting about for light sources that would not be restricted, as were his cameras, by the noise they created.

He had been experimenting with panchromatic film which was not blind to the red light, and in the incandescent tungsten bulb he saw a lighting medium with which he could obtain soft effects and which he could use for base lighting.

Some people in studio management saw in the incandescent bulb a means of economic gain whereby set lighting would be accomplished by a push of a button. They put all of their publicity efforts behind an incandescent-bulb campaign and for a time the carbon arc was virtually discarded, with orders in some places that it could be used only by special permission from the management.

False Economy in Production

Fortunately the novelty and value of added sound helped to overcome the photographic deficiencies of the period which followed. Camera lenses were not corrected for the red end of the spectrum and focus problems were legion. Sufficient incandescent-bulb equipment was not immediately available and certain motion pictures took on a dark, soft-focus appearance that was highly touted as the "new look" of the day.

The pressure against the use of the supplementary carbon-arc lamps for sunlight, streak-light and other of the depth- and drama-producing effects

★

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Arc Lamp Specialists for More Than a Quarter Century

was not only unfair to the efforts of the cinematographer, but to the value of the incandescent bulb itself. Partly as a result of this, many pictures were made where scope was limited to the techniques of the legitimate stage.

But as sound was absorbed into the industry, the cinematographer was again recognized as a creative artist. His immediate demands were for a lamp with twice the light and twice the penetrating power of anything available from the existing incandescent tungsten bulbs.

Flexibility the Keynote

A rifled glass reflector, which had been used for incandescent tungsten flood-lighting at a distance from the source, was used as a basis for this demand for twice the light and twice the penetrating power. From a light collecting and distribution standpoint it was particularly well engineered; from a utilization standpoint it was not flexible (Fig. 4). What the cinematographer wanted was a light with twice the intensity, twice the penetrating power and one that could be used at varying distance with control of beam spread and light distribution.

Of course the demand was fantastic! In order to give the cinematographer what he wanted, it would be necessary to sacrifice engineering efficiency all the way along the line. It would mean more powerful incandescent bulbs, bulkier equipment and higher operating costs. What had to be learned was that the efficiency of utilization was the all-important factor and that strictly engineering or tight-drawn economic factors must be made to compromise.

Compromises were made. Ten-kw bulbs were produced and even a 50-kw bulb was tried. The equipment became more flexible. Compromises were also made by the sound departments. Carbon-arc lamps, now filtered with electrolytic capacitors to reduce generator ripple, again appeared on sets where the effects of sunlight, streaklight and back-light would allow the cinematographer to express his individuality and to produce the illusion for which he was striving.

Constructive Outlook

It was this era that marked the first of the major changes made by manufacturers of studio-lighting equipment to provide units with maximum power and maximum utilization. Spe-

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cialized incandescent bulbs were produced to replace those which had been adapted from other fields. In 1934, lamps with large-diameter, mirror-type optical systems were replaced with stepped-prism condensers made along the lines of the well-known Fresnel lens system (Fig. 5, 6 and 7). It appeared as though the industry was settling down to a lighting technique in which the incandescent bulb and the carbon arc were lighting tools available to the cinematographer depending upon his own interpretation of his artistic needs. The one exception was the clarion cry, "I want a lamp with twice the light and twice the penetrating power."

The first major revolution was in the advent of sound. Now color stepped in for a go at it!

Carbon Arcs to the Fore

Technicolor, who had been struggling with a two-color process, announced that they were ready to launch motion pictures in the full color scale and that the white light of the carbon-arc lamp would be needed for the process. The announcement by Technicolor did not produce chaos in the industry as had the arrival of sound, because the studio people believed that color was something they could take or leave alone.

Technicolor's "Becky Sharp"

The advent of *Becky Sharp*, Technicolor's first major three-color release in 1935, did cause a revolution in the studio-lighting field. The carbon-arc lamp was again to be the predominant studio-light source and

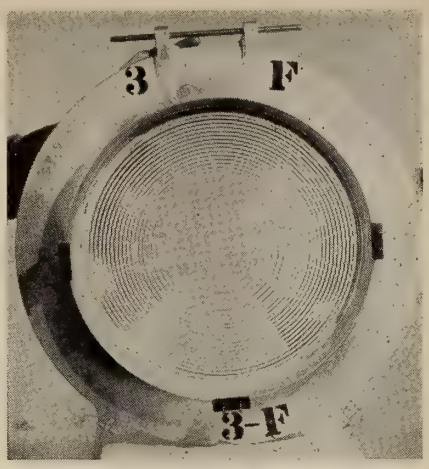


FIG. 5. Stepped-prism, Fresnel-type lens introduced in 1934. Controllable beam spread of from 8 to 48 degrees. Introduced to the industry by Mole-Richardson Co., Hollywood.

the unbalanced spectrum and comparatively low light output from a single unit of the incandescent bulb made its future appear quite bleak to many observers.

The New Arclamps

Some work had been done on the design of a new type of carbon-arc spotlamp and these were hurried into production. For floodlighting, an adaptation of the older carbon-arc floodlamps was made and later a completely new design was manufactured and replaced the earlier units. It was the heyday for the carbon arc. It would be necessary to throw away more than half of the energy from the incandescent lamp to make it match white light, so to all intents and purposes it was through insofar as use on color sets was concerned.

But the cinematographer missed the soft diffusion, the small overall equipment size and the fill-light quality he obtained from the incandescent lamp almost as much as he had missed the small source size and great power from one unit of the carbon arc in the early days of sound; so color filters were made and incandescent lamps found their proper niche in Technicolor photography even though the film sensitivity did not indicate their use as an economic value.

The more restricted latitude [ED. NOTE: *Latitude is leeway in lightening or darkening the film during development, thereby compensating for errors in photography*] and even the handling of color itself, made it necessary to apply greater engineering efficiency to motion-picture photography in order to obtain added dramatic effect which color itself could provide. For the successful introduction of three-color, motion-picture photography, Technicolor found it necessary to demand certain engineering requirements so that the finished product would provide this dramatic effect.

Light Balance Extremely Important

In order to accomplish this result they supplied their own technicians to operate the three-strip cameras and contracted with a number of successful cinematographers to supervise the set lighting. As soon as possible, all cinematographers were made familiar with color requirements, one of which was the accurate control of light. The cinematographer still does much of his light balancing by visual means, but he also reads *(Ed. Note: With an exposure meter.)* the incident light in various areas and when he goes beyond the latitude of the system

FIG. 6. Modern carbon-arc lamp equipment.



FIG. 7. Modern incandescent tungsten lamp equipment.



in order to obtain a certain dramatic effect he has been forewarned.

A Major Technicolor Advance

One of the major advances made by Technicolor was the announcement that they had doubled the photographic speed of the system. When the cinematographer was asked if this would bring about the use of smaller units, the response was that much of it would be used for increased depth of focus and greater latitude of operation. What was wanted was a light source with twice the penetrating power of existing lamps. A new super high-intensity, carbon-arc lamp was designed to fill this demand.

It should be noted that the first change from a preponderance of carbon arcs to a preponderance of incandescent bulbs was made possible through a change in film sensitivity. The next revolution in lighting was the result of the film sensitivity of the new Technicolor process. In each case one type of light source was almost superseded by the other, until management pressure was relaxed giving the cinematographer a chance to fit the units in where they could be used for the greatest dramatic effect.

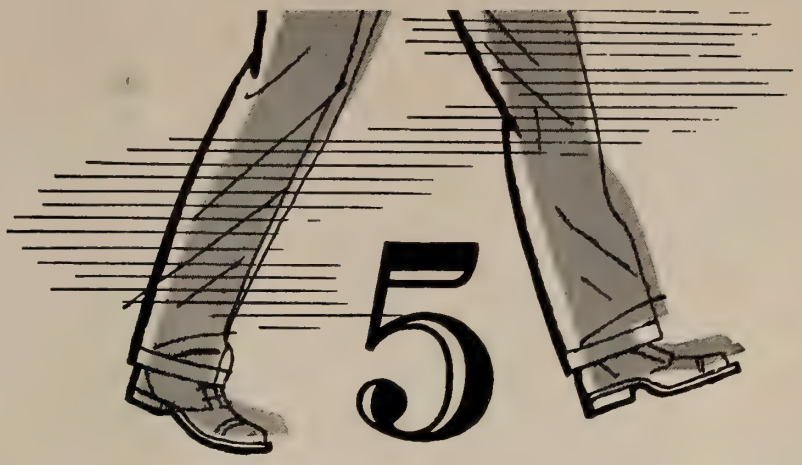
"Economics" the Watchword

The next revolution came during 1950 when, due to loss of revenue, the carbon arc, because of manpower requirements, was singled out as the "heavy" in the melodrama of economics versus production values.

Higher-powered incandescent lamps were demanded, a lamp that would produce twice the light and twice the penetrating power. The result was a revival of 10-kw lamps adapted to optics improved beyond ones that had been tried before, plus the wide usage of the highest-powered, carbon-arc lamps filtered to the spectrum of the incandescent lamp.

Penetrating Power, Light Output

An occasional cinematographer ventured color production on a white-light basis, but on the whole he remained with the tungsten balance because of so-called economics. He now wanted a lamp with the penetrating power and light output of twice that of the highest-powered, carbon-arc lamp, but with the color temperature of the incandescent lamp so he could use it on his sets freely



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Your National man will be glad to advise you on this new "5 Step" program. Being familiar with theatres of every size, his judgement will prove invaluable in guiding you towards modern theatre improvement.

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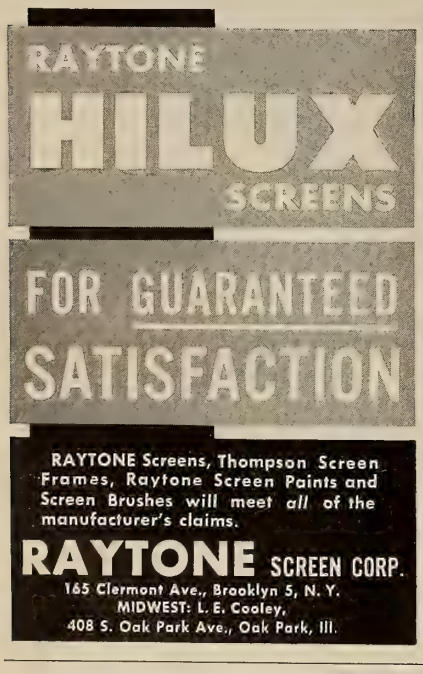
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mixed with incandescents and without the necessity of a lamp filter.

"Freedom of Choice" Vital

What he actually needs is more freedom of choice for the improvement of production values rather than for small economic squeezing which robs him of the initiative it takes to make something *differently the same.*

Now comes the revolution of 3-D and wide screen with requirements of smaller lens apertures, much larger sets and the extreme in production values. As always, more light, the maximum of latitude of operation, and the extreme in creative ability will be needed. If history repeats itself, as the pendulum swings toward fewer and better pictures, the choice of set-lighting equipment will again revert to the man who directs the use of it and he will be casting about for a controllable light source with twice the light output and twice the penetrating power of any existing equipment, whether it be incandescent tungsten, carbon arcs, or some other form of radiant energy.



New Victor 16-mm Amplifier

Victor Animatograph Corp. has introduced a new high-quality 10-watt amplifier to be used with its 16-mm sound-film projector (Assembly 10). The amplifier is a 50-60 cycle, A.C., Class O A1. push-pull unit, using a five-tube compliment, plus receiver.

With less than 2½% harmonic distortion throughout the full film range, the frequency scale is said to be within ± 2db from 100 to 6000 cycles. Signal-to-noise ratio is a minimum of 4 db. A special feature of the amplifier is a built-in compensating gain designed for proper sound reproduction of old film with opaque soundtracks. By turning the volume control past "Hi," this extra gain is realized.

Closed-Circuit Tv Hookup Is Expanded by TNT Firm

Large-screen television projection equipment, specially designed for use in closed-circuit big-screen Tv presentations at hotels, has been purchased by Theatre Network Television from General Precision Laboratory. The transaction includes 50 units which will be used to link meetings taking place in the same number of cities. This new network will augment the hookup to 100 theatres throughout the country which are now used by TNT to present sports events and other attractions over theatre Tv.

Closed-circuit Tv has up to now been handicapped by the absence of good equipment in sufficient quantity for use in hotels which accommodate medium-size audiences and are available at hours not practical for large film theatres.

Cinerama As U.S. Ambassador

Cinerama has had such a universal appeal wherever it has been shown in this country that the U. S. State Department is considering it as an ideal propaganda medium for use abroad. Plans are underway to present "This Is Cinerama" in Bangkok, Siam, regarded as a critical area so far as the maintenance of American prestige is concerned.

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from
PROJECTIONISTS LOCAL 253
Rochester, New York

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Jimmy Sturgees, *pres.;* Roy O'Connor, *vice-pres.;* Lou Lodge, *sec-treas.;* Bert Higgins, *rec.-sec.;* Pat Travers, *bus. rep.;* Lou Applebaum, Douglas Cameron, Dave Siegel, Roy Wilson, *exec. board;* Ted Covert, Loren Clark, Jack Harris, *trustees;* Jim Farrah, *sgt.-at-arms;* George Robinson, *tyler.*

25-30 CLUB, NEW YORK CITY

Jacob S. Winick, *pres.;* Anthony Boscorelli, *vice-pres.;* Benjamen Stern, *fin.-sec.;* Morris I. Klapholz, *rec.-sec.;* Joseph Perlman, Edgar T. Stewart, Julius Wetzler, *trustees;* Sidney Wein, *sgt.-at-arms.*

Downward Trend Reversed

National figures on both gross box-office revenue and individual attendance indicate that the motion picture business is reversing the downward trend which began in 1946. Gross income for this year, 1954, is expected to reach $1,191,200,000, which would be a jump of $183,700,000, or 18%, over 1953.

The *total number* of admissions to theatres is also rising. Ticket purchases during the second quarter of 1954 exceeded the same period in 1953 by 42,900,000, indicating a rise of 7½%. This same rate of improvement continued in the third quarter. Attendance had been dropping steadily for years. After hitting a all-time record weekly average of 82,400,000 in 1946, it steadily fell off until it reached a low of 45,900,000 weekly average in 1953. This year's figures reversed the trend.

The improvement in attendance, although smaller than the gain in gross box-office revenue, is probably more significant because the gain is in part the result of increased admission prices.

According to the Committee of Motion Picture Organization, which compiled these figures, only 44% of the estimated gain in box-office revenue during this year can be attributed to higher attendance; 56% is said to result from that part of the reduced Federal admissions tax which exhibitors have retained as part of admission prices.

Aperture Plate by LaVezzi

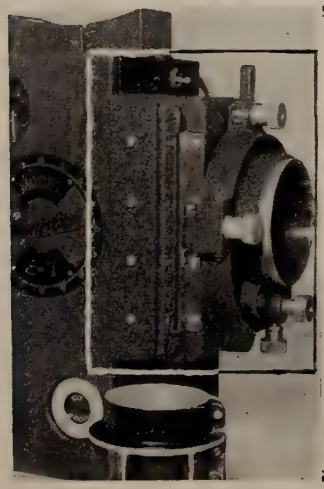
A new spring-loaded aperture plate, designated as the SP-672-E series and for use with either the standard or Super Simplex projector mechanisms has just been introduced by LaVezzi Machine Works. This new device, which replaces both the regular P-672-E aperture plate and the P-445-E sliding piece, is an assembly of the aperture plate and a blue tempered spring steel wedge which holds the plate firmly in place in the film trap.



The new spring-loaded aperture plate now available from LaVezzi.

Purpose of the new part is to eliminate the need for handling two plates each time the aperture is removed and to make changes from one aspect ratio to another faster and easier. Also added is a new finger-grip bend on the plate to facilitate rapid removal. The aperture plate is available in all aspect ratios for regular and CinemaScope projection, and are on display at theatre equipment dealers everywhere.

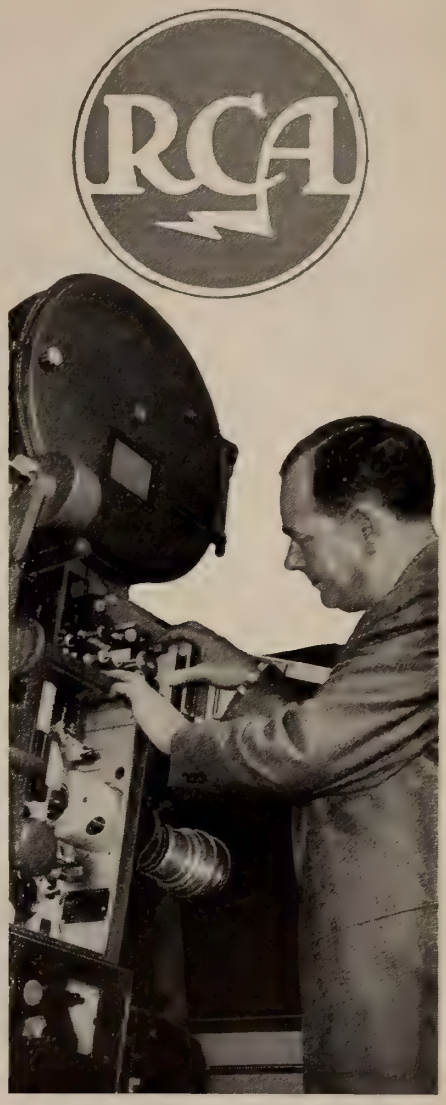
Further details are available from LaVezzi at 4635 West Lake St., Chicago.



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VISTAVISION ON THE MOVE

(Continued from page 12)

many projectors are either in focus on right screen, or on left screen, but never in focus on both.

In the writer's opinion, all projectors for large-theatre and drive-in presentation should have water-cooled gates, preferably water-cooling in the lamphouse air-cooling of the film, and a high-velocity jetted air stream to minimize film buckle in the gate.

This jet of air is a *must* if we are to get sharp pictures on screens of 45 feet and wider—and with standard lenses with a focal length of 3 inches or under; or, in the case of anamorphics, if the accompanying lens is 6 inches or under.

We at Paramount find that the old tolerances, regarding weave, picture jump and flicker, are inadequate for real good quality on very large screens. Much work should be done on flicker, which is probably one of the most annoying things now existent in motion picture projection.

Paramount recognizes the problem of the projectionist. He is further from the screen than any of the audience. His is the worst place in the theatre in which to do the focusing. Focus indicators and automatic focusing devices are being worked on by Paramount. We hope that these units will assist and simplify the job of the projectionist.

Much has been said and written about aspect ratios. The fact is there is much more latitude in aspect ratios than most people realize. The Paramount product is photographed to play best at an aspect ratio of 1.85/1 and 1.66/1. It will also play to good advantage at 2/1, or down to the old 1.33/1 (4/3). These are positive and fixed figures, and it probably would be better if we would stop talking "aspect ratios" and fill the proscenium with picture. We should determine the best screen shape for the theatre and in so far as possible mold the product into this plan.

The writer has recently visited theatres in most important cities in the United States, and along with his assistants has visited theatres in all principal cities around the world. We find that if the theatre has adequate screen lighting for other products, it also has adequate lighting for the presentation of VistaVision pictures.

The VistaVision demonstration, recently held in the Music Hall, on a screen 70 feet wide by 38 feet high, used standard projection equipment with standard lighting equipment, projecting on a flat, wide screen.

Adequate Screen Illumination

In most theatres, the writer has reduced rather than increased the lamp current. This is especially true with the double-frame projectors such as are now being used in The Music Hall, New York, and the Warner's Beverly Theatre in Hollywood, where we are presenting "White Christmas" by the double-frame projection system.

Data that has recently been published would indicate that the Paramount system will not work and that with VistaVision there will be a great shortage of screen illumination. This data is incorrect, as related to VistaVision. I am sure the writers of these articles have never worked with VistaVision, or the data that is published would be different.

Paramount is not anti-any system. At all our demonstrations we have

REPLACE APERTURES QUICKLY with the NEW LaVezzi SPRING LOADED APERTURE PLATE!



For Standard and Super Projectors. Remove one aspect ratio plate and replace with another—zip-zip—that quick! The blue tempered spring steel wedge holds plate firmly in place and the new finger grip facilitates rapid removal. Eliminates the P-445-E Sliding Piece.

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For DRIVE-INS & THEATRES with HUGE, WIDE-AREA SCREENS • CARBONS, Inc. BOONTON, N.J.

for CinemaScope

paid tribute to the good that has been done by Cinerama, Cinemascope—and even 3-D. We have not necessarily agreed with the techniques used, but we are most emphatic in our feeling that each has contributed to the general advancement of motion pictures.

With respect to sound, there have been many techniques proposed. Paramount joins with those who have questioned the dollar-rate-per-dollar investment in the case of elaborate stereophonic installations. All Paramount VistaVision pictures will carry Perspecta stereophonic sound for those theatres that wish stereophonic sound. These same prints will play on any standard optical sound reproducer any place in the world.

In the writer's opinion, if as much money would be spent in improving optical sound as has been spent on magnetics, we would have a far better product today. We anticipate making the same quality improvement in our optical sound that we have made in our picture quality.

Optical Sound Quality Lauded

Paramount will use optical sound on all double-frame prints. The film speed will be 180 feet per minute and tests indicate that the sound quality will be equal or superior to that which can be obtained by magnetic. Magnetic sound can of course be used with the VistaVision process, if any other company should so elect.

Looking to the future, the Paramount program is well formulated. We see no reason to make any major changes and we contemplate a long continuance of this program. Most theatres have installed large screens and many theatres have good projection equipment. This makes our Paramount group very happy, since these theatres can join the VistaVision family without spending a cent. We are preparing a booklet on VistaVision presentation and theatre standardization. Our aim is to help you to do a beter and simpler job in the presentation of all types of motion pictures.

WIDE-SCREEN PROCESSES UP INHERENT DEFECTS

(Continued from page 10)

bearing by loosening the 2 set-screws (but do not disturb the screws that hold the bearing, itself, in place).

4. Place the sprocket-cover-star assembly on a V-block, the V-indentation contacting the sprocket-hub midway between the two taper pins. Make sure that the large ends of the pins point downward, and that the sprocket and shaft are firmly and evenly supported.

5. Drive the pins out either with a pin-ejector or with a small drive-punch and a light peen-hammer, using light blows to avoid damaging the parts. The starwheel shaft is then pulled out of the sprocket and out of the cover bearing.

Reassembly a Delicate Job

6. Clean the starwheel shaft and the bore of the new sprocket, and lightly oil each surface. Run the star shaft back and forth in the bore of the new sprocket several times to make certain that the fit is not too tight for final assembly. If the fit is somewhat tight, use a twisting motion, but never apply force obliquely to the star shaft. And never pound the shaft into the sprocket! A sprung star shaft makes the sprocket wobble and the picture dance 6 times each second.

7. Reassemble the parts, and line up the taper-pin holes with a taper-pin reamer. After each of the two pins is inserted, place the assembly on the V-block and tap the pin securely into place with light blows—but avoid violent pounding! Cut off any excess length of pins that may interfere with the film-stripper.

8. Restore the outboard-bearing collar, and check the end-play of the starwheel shaft. The shaft should have only enough end-play for running clearance—no more.

9. Replace film-stripper.

10. Replace gasket on the rim of the case,

Best Wishes

Projectionist Local No. 486

I. A. T. S. E.

Hartford, Conn.

Season's Greetings

PROJECTIONISTS LOCAL 414

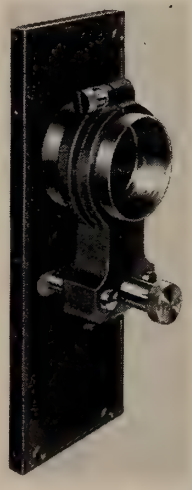
Wichita Kansas

Holiday Greetings

Projectionists Local No. 182

I. A. T. S. E.

Boston, Mass.



PRO 47

FRONT LENS FOCUSING ATTACHMENT

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aligning all holes. Prepare to replace cover, making sure that the locating pin and corresponding hole are in line, and then *very gently* engage one of the curved sides of the starwheel with the curved surface of the cam, at the same time entering the cover-pin into the hole in the cover. Replace retaining, oil-drain, and clamp screws, with clamps, and tighten evenly all around.

11. Turn the flywheel with the fingers to test the "feel" of the movement. If (a) the movement clicks when the sprocket starts to move, if (b) the movement binds when the sprocket is in the locked position, or if (c) there is backlash in the sprocket when in the locked position, the cover-screws must be loosened and the movement adjusted as follows:

12. Turn the flywheel until the star is in the locked position. Then hold the movement horizontally so that the ring of the cam rests upon a curved side of the star-wheel, and allow the cover to settle by its own weight, causing better contact between star and cam. The cover retaining-screws are then tightened securely.

The intermittent movement is put back into the projector by reversing the procedure given for taking it out. To preserve the timing of the shutter, however, the gears must be meshed in their original relationship. This will automatically occur if the projector is not disturbed while the intermittent was out; otherwise reference to "dot" punchmarks and "O" marks on gears and flywheel must be made. This expedient is less trouble than readjusting the shutter.

1. Mesh the intermediate gear with the flywheel gear so that the white dot (or punchmark) on the intermediate gear is adjacent to the little "O" mark on the intermittent flywheel.

2. Swing the body of the intermittent movement so that the oil-tube assumes the same position it had when the movement was removed.

3. While holding the intermediate and flywheel gears in mesh, insert intermittent into mechanism. At the same time, insert the intermediate-gear shaft into its bearing, aligning the hole in the rim of the intermittent case with the pin in the framing ring, *pushing the intermittent movement in, but not so far as to mesh the intermediate gear with the vertical-shaft gear.*

4. Now turn the vertical-shaft gear by means of the shutter shaft so that the "O" mark on the vertical-shaft gear-collar faces you. Then turn the intermediate gear, keeping the mesh with the intermittent, so that the white dot (or punchmark) on the intermediate gear (which has been adjacent to the "O" on the flywheel) is now aligned with the "O" on the vertical-shaft gear.

5. When in this position, mesh the gears by pushing both intermediate gear and intermittent movement all the way in.

6. Set the two intermittent-movement clamps on the operating side and tighten the clamp-screws, and replace intermediate-shaft retaining collar, allowing only a very slight amount of end-play in the intermediate-gear shaft.

7. Turn the mechanism by means of the shutter-shaft knob to note the "feel" when the intermittent sprocket stops and starts. There should be no clicking when the sprocket starts to move, and the mechanism should not bind when sprocket is in the locked position.

8. The head is still disconnected mechanically from the sound reproducer and motor, so return main drive gear. Also replace "spot" sight-box and *fill the intermittent with the required quantity of fresh oil.*

Don't forget the oil, because without it the movement will bind after just a few hours or days of running and be utterly ruined. A dry intermittent binds with startling suddenness. All seems to be well one moment, and the next moment the intermittent emits an ear-splitting scream and stops dead. The main drive-gear usually strips, and sometimes the spiral shutter-gear, also. Failure of the drive gear to strip may result in serious damage to sound-head gears and motor. And all because somebody forgot to oil the intermittent!

9. As an added precaution, turn the projector over by hand a few times to make ab-

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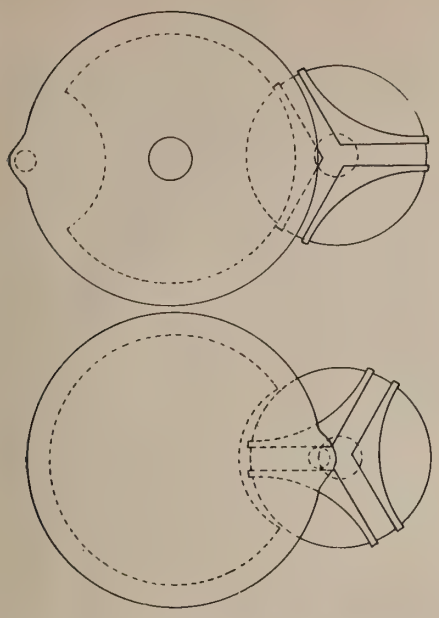
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A Geneva type 5-to-1 movement. This intermittent is workable, but has two disadvantages—terrific leverage during pull-down, and the necessity for using a small 12-tooth sprocket which might damage sproket-holes.

solutely certain that everything is free before turning the motor on. This is a good time to check the timing of the shutter, correcting any minor misadjustment by means of the shutter-timing knob. Then "run in" the projector several minutes, listening carefully to make sure that the intermittent runs quietly *with the gate door open.* The movement should barely whisper—if it clicks or whirs loudly, then it must be taken out again and readjusted. Naturally, it will make a slight whirring sound when the gate door is closed, and a louder noise when film is run. Finally, project a reel of film. If the picture looks good, then the machine is in perfect condition for the next show.

Later-Model Projectors

To change sprockets in the Simplex E-7, the gear side of the mechanism need not be touched except to remove the sound drive-gear for the purpose of turning over the freed mechanism by hand to get the "feel." The cover of the intermittent-movement case may be removed from the operating side, after taking the film-gate out, but the oil has to be drained from the movement while it is in the machine, and this is admittedly a messy job. The oil must not be permitted to seep into the sound-head.

Any construction which requires disturbance of the fussy star-and-cam adjustment merely to change the sprocket must be considered obsolete today. Such excellent modern projectors as the Simplex X-L and the Motiograph AA enable the projectionist to change intermittent sprockets in a matter of a couple of minutes by merely removing the outboard bearing from the operating side of the projector. The RCA Brenkert Models 40, 60, and 80 come closest to such standard European machines as the Ernemann, Bauer, Askania, Aga Baltic, Mikrotechnika, etc., in regard to ease of sprocket-changing. In the Brenkert projectors it is only necessary to swing the film-stripper out of the way, remove the "locking plate" at the end of the sprocket, take out the end-fastening screw, and slide the sprocket off the shaft with the fingers.

The long and complicated directions given above for sprocket-changing on the older Simplex-type mechanisms will undoubtedly astonish projectionists overseas who are unacquainted with these machines, and who are accustomed to removing the intermittent sprockets even for routine cleaning.

Loyalty to Old Machines

But many American projectionists regard these old-style machines with tender attachment, the result of many years of experience with them. And if ever the starwheel or cam should get badly worn in one of these old projectors, the projectionist who knows how to change intermittent sprockets would encounter nothing new in the task of replacing the inner parts. He already knows how to take the intermittent movement apart and put it together again.

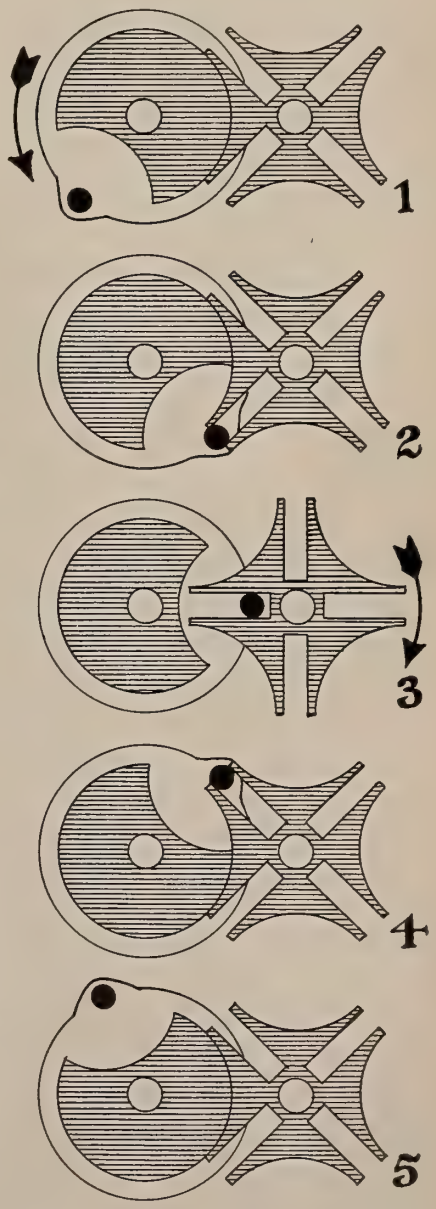
It is not always necessary to replace a worn intermittent sprocket with a brand-new sprocket. If only one side of the teeth shows the characteristic notching caused by wear, the sprocket may be reversed to make use of the other side of the teeth. Only when both sides of the teeth have been used is it necessary to install a new sprocket. Many projector manufacturers encourage this economy.

Sprocket-Tooth Noise

Worn sprocket teeth may be detected by passing a sharp knife-blade over the underside of a tooth—a "click" indicates a notch worn into the base of the tooth. Several consecutive teeth should thus be tested, for different teeth of intermittent sprockets wear by different amounts. It is ordinarily found that every fourth tooth shows approximately the same amount of wear, while the teeth in between show either less or more wear.

Notched sprocket teeth tend to make the film adhere to the sprocket, hence the tearing noise as the film pulls away. Not only are the film perforations "checked" and otherwise damaged, but the projected picture will very likely have an unsteadiness greater than the maximum "jump tolerances" previously g i v e n—10 microns for the standard 1.37/1 aspect ratio, 8.28 microns for the wide-screen 1.66/1 ratio, 7.62 microns for the wide-screen 1.85/1 ratio, etc.

While picture-unsteadiness may in some cases be due to mechanical vibration of the projector, a loose lens, or other causes external to the intermittent movement, all jumpiness due



Operational principle of the conventional Geneva intermittent movement, standard in 35-mm projection today.

to a faulty intermittent or other causes of film mis-registration at the aperture (such as insufficient or uneven gate tension) may be measured percentage-wise.

Each pull-down of the film over the aperture amounts to 1 frame. The length of 1 frame of film is ¾ of an inch (19 mm.). If each pull-down is *exactly* 0.75 inch, the picture on the screen will be perfectly rock-steady if the film is properly photographed and printed; but if the succeeding pull-down distances vary slightly from frame to frame, the picture will be unsteady. We have already seen that the maximum registration-variation permissible in standard projection is 10 microns (0.39 mil.). This is a variation of 0.052% of the total 0.75-inch pull-down distance.

The European Outlook

Many European projector manufacturers furnish pull-down variation figures for their machines, thus permitting prospective purchasers to judge the quality of the various makes of projector. This practice also sparks competition, which goes to increase the quality of all European machines. American manufacturers might well follow their example, even though practically all American projectors are made by only three companies, one of which is a combine producing several makes.

Just as the intermittent pull-down variations must not exceed 0.052% when the standard aspect ratio of 1.37/1 is used, the permissible variations are even smaller in non-anamorphic wide-screen projection—0.044% for the 1.66/1 ratio, 0.040% for the 1.85/1 ratio, 0.036% for the 2/1 ratio, and 0.029% for the 2.5/1 ratio.

The dimensions of the starwheel and cam have a great deal to do with the accuracy of an intermittent movement. The wider the running surfaces, the longer these parts will last, assuming that they are properly made of the best metals and given good care by the projectionist. And when the diameters of star and cam are oversize, unusually high accuracy of performance is attained even when these parts are finished to ordinary manufacturing tolerances.

The Brenkert Method

The American Brenkert projector resembles many European machines in the large size of the star and cam. (The steel *roller* pin of the cam is another excellent European feature of the Brenkert.) The tolerances held in Brenkert intermittent parts are under 0.05 mil (1.27 microns)—often only 0.04 mil (1.02 microns). This close tolerance is equivalent to about 0.035 mil (0.89 micron) in the usual smaller-size stars and cams.

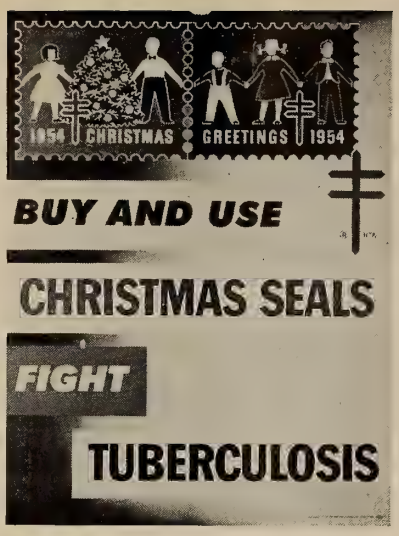
The life of the projectionist is filled with surprises. Among the different projectors tested by the writer in gathering data for this article was one (not old-fashioned, but nevertheless no longer in wide use) which has an intermittent manufactured to the rather large tolerance of 0.2 mil (5.08 microns). This tolerance seems almost too great for satisfactory intermittent action. It is conceivable that the errors in starwheel, shaft, and sprocket could "add" to produce registration-variations as great as 0.6 mil (about 15 microns). This is 1/3 greater than the permissible misregistration of the film in standard projection.

A Surprising Circumstance

Strangely, that make of projector, though not so accurately made as most others, projected a picture as rock-steady as any that the writer has ever seen. Picture-steadiness was measured on a 50-foot drive-in screen, and no unsteadiness—not even a trace—could be detected in the picture produced by either of the two projectors of the installation!

A machine which gives a steadier picture than might seem possible from a consideration of its constructional details is infinitely less damaging to the welfare of the exhibition industry, however, than a "good" projector which, through carelessness, mishandling, or neglect, fails to deliver the rock-steady, lifelike images which present-day audiences have come to expect of the theatre screen regardless of the aspect ratio. It's time to check—and to correct, if necessary.

[THE END]



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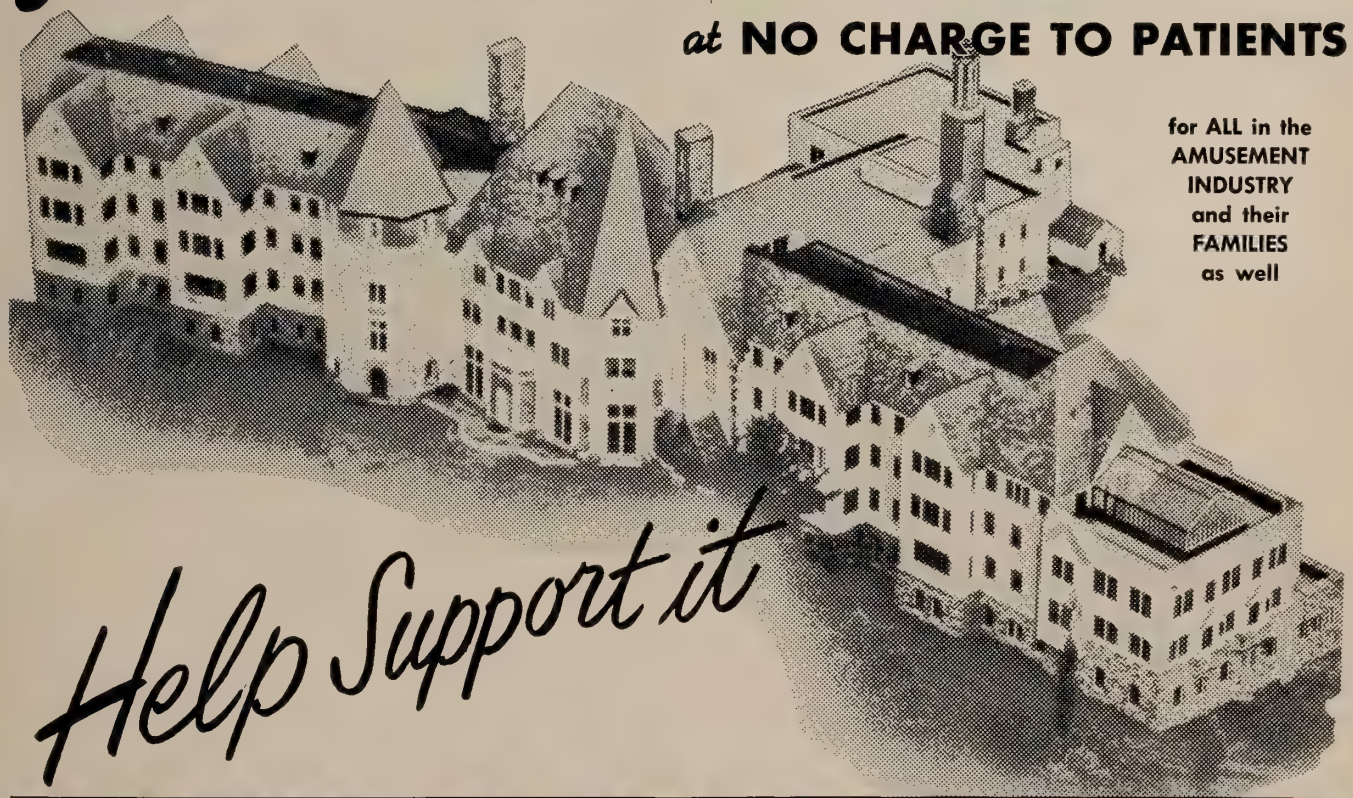
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